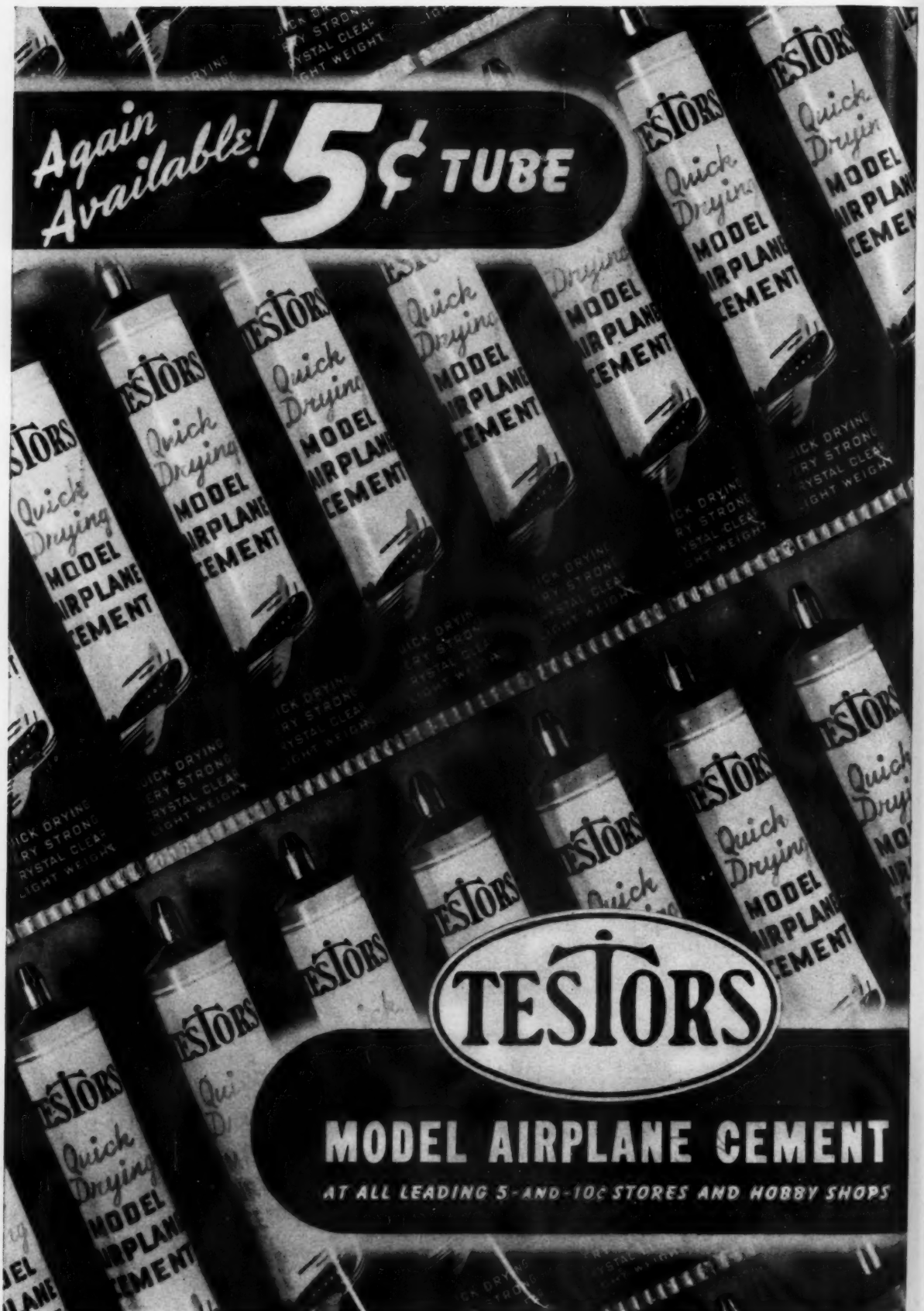
MODEL AIRPLANE NEWS

STORMAVIK IL-2 FIGHTER


Again Available!
5¢ TUBE
TESTORS
Quick Drying
MODEL AIRPLANE CEMENT
TESTORS
MODEL AIRPLANE CEMENT
AT ALL LEADING 5-AND-10¢ STORES AND HOBBY SHOPS

We're in a hard war that may last a long time. When YOU reach military age, within the next few years, will YOU be trained to take an ESSENTIAL part in America's war of production and at the same time fit yourself for a career in Aviation? See the Curtiss-Wright Technical Institute ad on page 3.

Super-Cyclone Owners

Most replacement parts are still available at the original prices. A parts list will be sent upon request. Since you have this excellent engine, keep it in good condition for the duration.

AIRCRAFT INDUSTRIES CO.

Grand Central Air Terminal, Glendale, California

HOME OF THE FAMOUS

CURTISS-WRIGHT TECHNICAL INSTITUTE

BRIGADIER GENERAL CLAIRE L. CHENNAULT has been awarded the Distinguished Service Medal for his services as Commander of the China Air Task Force. The citation: "As commander of the China Air Task Force since July 4th, 1942, Claire L. Chennault, Brigadier General, United States Army, has demonstrated keen knowledge of Japanese air tactics and technique. Although greatly outnumbered in airplane, personnel and other essential needs, he has succeeded in protecting a large portion of unoccupied China from hostile air attack and in inflicting severe losses upon the enemy. His understanding and appreciation of problems in the China theatre has resulted in successful air operations and a high degree of good will between the United States Forces and the people of China."

Chennault, then a retired Major of the Army Air Corps, went to China shortly after the outbreak of the Sino-Japanese war to train pursuit units of the Chinese Air Forces. Later he became leader of the American Volunteer Group, known as the "Flying Tigers." He was recalled to active duty in the United States Army on April 15, 1942 and commissioned a Brigadier General.

Chennault was born in Commerce, Texas on September 6th, 1890 and attended Louisiana State University and Louisiana State Normal College. He entered the Army as a First Lieutenant of Infantry on November 27th, 1917. Previous decorations include the Chinese Military Medal and the Order of the British Empire.

Major David L. "Tex" Hill, new commander of the United States Army Air Forces group in China, formerly the "Flying Tigers," has reported the appearance of two new type Japanese fighter planes. One is the I-45, which is a twin engine destroyer plane similar in appearance to the Luftwaffe's Messerschmitt Me-110 except that the Jap plane is powered by two air-cooled radial engines. The ship is extremely fast having a top speed "about 20 miles per hour faster than the Zero." This would indicate a maximum speed of about 330 mph. for this new ship. (For details of the Zero see MODEL AIRPLANE NEWS, January 1943 issue.) The other ship is the 97-2 which is similar in appearance to the German Messerschmitt Me-109 single seat fighter. We shall bring you additional details on these two airplanes as soon as they are available.

The following are brief excerpts from an address by Lieutenant General Henry H. Arnold, Commanding General of the Army Air Forces, to the Graduating Class from Randolph, Kelly and Brooks Fields in Texas:

"Our monthly airplane production is over 4,000."

"From February 1st, 1942 through December 5th, 1942, the Army Air Forces have definitely destroyed 928 enemy planes and probably destroyed 276 in aerial combat. We have lost 130 of our own and 104 are missing. As the result of aerial fighting, the score stands 928 enemy planes knocked out against 234 of ours. The ratio of planes lost is about four to one in our favor.

"We have a 'secret weapon' or two up our aerial sleeves that will deal paralyzing blows to our enemies. Our fighters and bombers are steadily increasing in range, speed, firepower and bomb loads. I will also state that entirely new 'battle-wagons' are on the way. We'll soon put on a special demonstration for Hitler and Hirohito—we don't think that they are going to like it either.

"Today, one year after Pearl Harbor, the Army Air Forces have over a million officers and men. And we will have over 2,000,000 officers and men by the end of 1943.

"I tell you now that both the German and the Japanese Air Forces are on the down grade. They have passed their peak.

"This is what (the Army Air Forces) have done (to enemy shipping): Sunk: 51: Believed sunk: 21; Hit and damaged: 159.

"You will be interested to hear that the records of the past year show that flying in the Army Air Forces is the safest military flying in any of the world's air forces. Our fliers are the best in the world."

Major General Jimmy Doolittle, commander of the Eighth Army Air Force in North Africa, has a Boeing B-17 Flying Fortress as his own personal transport for tours of inspection. But because he might just happen to run across a particularly good target he always carries two large bombs in the bombbay!

Wright Field's new wind tunnel has the largest single unit electric induction motor in the entire world: 40,000 horsepower! It blasts air through the 20-foot tunnel at speeds up to 450 mph.

Vice President Henry A. Wallace states that one method of preserving peace following the cessation of hostilities is the formation and maintenance of a World Air Force to police the defeated nations thereby preventing them from laying plans leading to a Third World War.

The British Air Ministry in its recent report outlining the operations of the Royal Air Force for the year ending December 31st, 1942 states that Allied air strength has established superiority on all fronts and is now stronger by two-fold than the enemy. The Royal Air Force alone is larger than the combined German and Italian air forces, states the report. Going into detail, the point is brought out that the front is the last point along the line that a definite weakness is made evident and that recent slowing down of German airpower at the front indicates a collapse throughout the production, pilot training and tactical use of airpower in the Reich. The R.A.F. Coastal Command alone has made 300 at-

(Continued on page 54)

14TH YEAR OF PUBLICATION

MODEL AIRPLANE NEWS

MARCH, 1943 VOL. XXVIII, No. 3

CONTENTS

FEATURE

Fighters Unmasked..... 6

RUBBER POWERED

Soaring Champ.....22

GAS POWERED

An Ercoupe From Lilliput.....11

THREE VIEWS

Vought SB2U-1..... 8
Stormavik IL-2.....20
North American NA-73.....28
Hotspur Cargo Glider.....34
Short Sterling.....36

SCIENCE

Plane Tricks.....10
Modeling Your Future in Aviation 18
Stressing Your Gas Job.....29

PLANE ON THE COVER

Soviet Stormavik.....21

NEWS

Flash News..... 2
Frontiers 16
Air Ways.....26
Aviation Advisory Board.....30
Air Youth.....30
Canada's Junior Air Force...31
Sky Scouts.....35

Edited by
Charles Hampson Grant

Published monthly by Air Age, Inc., Mount Morris, Illinois. Editorial and advertising offices: 551 Fifth Ave., New York, N. Y. George C. Johnson, President; Jay P. Cleveland, Advertising Manager. Entered as second class matter Dec. 6, 1934 at the post office at Mount Morris, Ill., under the act of March 3, 1879. Additional entry at New York, N. Y. Price 20c per copy. Subscriptions $2 per year in the United States and possessions; also Canada, Cuba, Mexico, Panama and South America. All other countries $2.50 per year. *Copyright 1943 by Air Age, Inc.*

SAFE TRAINING FOR YOUR CAREER IN AVIATION

With thousands of men taking advantage of opportunities in the war program; in the aircraft industry, many are untrained, many are "quickie course" graduates and all are eager to do their part . . . it is not difficult to find a TEMPORARY spot. But, if you seek an important supervisory position, in the industry, or a high technical rating in the U. S. Air Forces, you must have thorough training for today's assignment, and for tomorrow's; only such long range training can fit you for a career in the tremendous expansion of civil aviation after the war.

The executives who have made aviation THEIR career know the value of each man is governed by two factors: his intelligent sincerity in selecting aviation as his life work, and THE ABILITY AND EXPERIENCE OF THOSE WHO TRAIN HIM FOR THAT CAREER. They know that Curtiss-Wright Technical Institute graduates are—and for many years have been—thoroughly qualified to fill the industry's requirements.

Located in the very center and a very important part of Southern California's great aircraft industry, with its more than two billion dollars in unfilled orders, Curtiss-Wright Tec has come to be recognized as the nation's leading institution for the training of Aeronautical Engineers and Master Mechanics.

Mr. Donald Douglas, President of the great Douglas Aircraft Company, chose this school for his own son's training, which pointedly indicates the high standing Curtiss-Wright Tec has attained in the aircraft industry since its establishment in 1929.

It is imperative that before you invest in a course of career training you determine what the returns will be on your investment . . . for your choice of a school in which to take your training will determine how much money you will make the rest of your life.

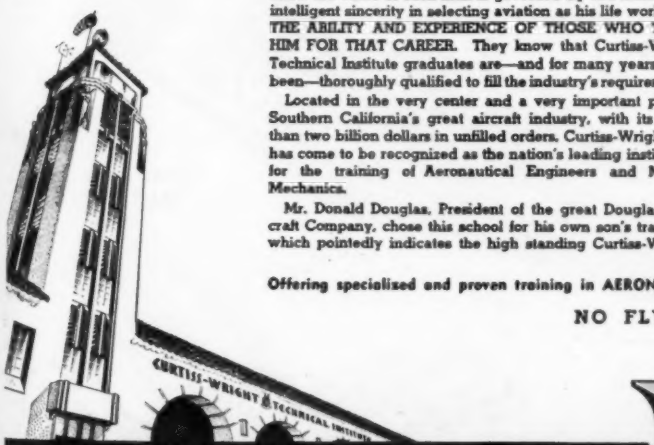
Curtiss-Wright Tec's career training is carefully designed to do just one thing:—TO MAKE MONEY FOR YOU, so upon graduation you can be independent and self-supporting for life. Our thousands of successful graduates have proven Curtiss-Wright Tec training gets results and alway pays, since it trained them in advance for the highest position they could ever expect to occupy. It can do the same for you.

This school has never guaranteed positions for its graduates, but practically every graduate has obtained immediate employment and is advancing rapidly. The demand for our graduates far exceeds the supply, and we honestly believe every student who enrolls here will be able to obtain, with our assistance, immediate employment upon graduation.

WARNING!—"Don't miss the boat." The greatest opportunity in your lifetime exists today! There never was such an opportunity in aviation for you; there may never be another. A position awaits you. Insure for yourself a steady income and independence for life. DON'T FOLLOW—LEAD! Send in your enrollment before you "miss the boat."

Offering specialized and proven training in AERONAUTICAL ENGINEERING & MASTER MECHANICS

NO FLYING INVOLVED



THIS TOWER OVERLOOKS AVIATION'S MOST DISTINGUISHED SCHOOL OF AERONAUTICS

CURTISS WRIGHT TECHNICAL INSTITUTE

GRAND CENTRAL AIR TERMINAL, 1229 AIRWAY, GLENDALE (LOS ANGELES) CALIF.
UNDER PERSONAL SUPERVISION OF MAJOR C. C. MOSELEY, OWNER, SINCE ITS ESTABLISHMENT IN 1929

Contractor to the U. S. Army Air Corps

JOIN THE U. S. AIR FORCES

BE WISE—PROTECT YOUR FUTURE

MAIL TODAY • DON'T DELAY

WITHOUT COST OR OBLIGATION SEND ME FULL INFORMATION AND CATALOG ON THE COURSE CHECKED BELOW

- ☐ AERONAUTICAL ENGINEERING COURSE
- ☐ MASTER AVIATION MECHANIC COURSE
- ☐ SPECIALIZED ENGINE COURSE
- ☐ SPECIALIZED AIRPLANE COURSE
- ☐ SPECIALIZED AIRCRAFT WELDING COURSE
- ☐ POST GRADUATE AERONAUTICAL ENGINEERING COURSE
- ☐ SPECIALIZED AIRCRAFT SHEET METAL COURSE
- ☐ AERONAUTICAL DRAFTING COURSE, HOME STUDY
- ☐ AIRCRAFT BLUE PRINT READING COURSE, HOME STUDY

NAME

ADDRESS

CITY STATE N-3

"Model Building Played a Big Part in My Accomplishing My

writes Lt. L. W. N. of an AAF Fighter Squadron "Somewhere in New England"

Continuing, he says: "I am a Lieutenant in the United States Air Force and flying at the present time the Speedy Pursuit P-47. I have only been commissioned two months, so the previous time was spent as a Cadet. As you know, we have ground school all during the 8 months course —there's where this model airplane building has helped 100%. It came in handy in the courses we had in Aerodynamics and Airplane Identification. I have known the U.S. planes by split second sight and as an Army pilot you have to know them on sight and faster than your eye can wink. So all in all you can see that model airplane building has played a big part in my accomplishing my goal as a Flying Officer and getting those precious Silver Wings."

Republic P-47 "THUNDERBOLT"

A terrifying name that's being lived up to. It's a regular "flying battleship" with tremendous striking power. Has a speed of over 425 m.p.h. and a 40,000 foot ceiling. A deadly fighter that's proving a scourge to our enemies. It's also a "must" model for all modelbuilders. Span 30¾". C-D Master Kit SF-81 ..... **$4.00**

America's Favorite GAS MODEL Prize Winning Trio

Kits Complete Except Motors

PLAYBOY SR. Class C Gas. Huge 80" span. Breaking records everywhere. 800 sq. in. Kit GP-5017 (except motor unit) **$4.95**

PLAYBOY JR. Class B Gas. Span 54½" (360 sq. in). Kit GP-5006 (e.m.u.) **$2.95**

BABY PLAYBOY Class A Gas. Span 33". Biggest gas value on market. Kit GP-5008 (e.m.u.) **$1.00**

Big 3-Ft. War Models, each only $1.50

All Victory models are extremely authentic for their low price. Biggest values on market. All Kits are complete. **Each only $1.50.**

T91-"Mustang"

T76-"Airacobra"

T77-"Warhawk"

T74-Messerschmitt ME-109

T78-Hurricane

T85-Lock-P-38 "Lightning"

These models are also available in C-D Master Kits—all ¾" scale.

★ ★

SF-74,	$3.00
SF-76,	3.00
SF-77,	3.00
SF-78,	3.00
SF-85,	4.00
SF-91,	3.00

Vought-Sikorsky "CORSAIR"

A Navy fighter in the 500 m.p.h. class. Span 30 3/16". C-D Master Kit SF-79 ..... **$3.50**

North American "MUSTANG"

A tough, vicious fighter that is today very much in the news for the spectacular fighting it is doing. Known as the P-51 "Apache", but rechristened "Mustang" by the British. Flies something over 350 m.p.m. Span is 27 3/16". C-D Master Kit SF-91 ..... **$3.00**

Build the Biggest 50c Plane in U. S.

BIG 4-FOOT EAGLET GLIDER

Unusually good model of a secondary type glider. Patterned after "Baby" Bowlus. Easily made. Kit VE-5018 ..... **50c**

A Victory Hobby

With gasoline rationing giving America more time to spend at home, no other hobby can so interestingly fill so many spare hours at so little expense, as the building of C-D models. Invest in War Savings Stamps or War Bonds—with the pastime money you save by building C-D models!

C-D Models are "America's First Line" in Engineering, Design and Realism

Grumman F4F "WILDCAT"

An excellent U.S. Navy Shipboard and Marine fighter. Lives up to its name —in the case, for instance, where one of our men downed 5 Jap bombers in 5 minutes. Very maneuverable. Has a speed of 325 m.p.h. Model Span is 26½". C-D Master Kit SF-83 ..... **$3.00**

British "SPITFIRE"

Pride of the RAF. Fast, maneuverable and a dealy interceptor-fighter. Span is 27⅝". C-D Master Kit SF-78 ..... **$3.00**

Nazi DIVE BOMBER JUNKERS JU-87 STUKA

One of Nazis' greatest weapons for terrorizing and wreaking heavy destruction upon Europe. Span is 34". C-D Master Kit SF-84 ..... **$3.50**

Build the New, Redesigned Super CONDOR Soarer

Better duration, longer flights. Huge 7 ft. span. You can't get a better design for learning principles of advanced soaring flight. Kit VE-5019 ..... **$1.00**

When You Build CLEVELAND *that Pilots, Bombardiers, Instructors, Cadets-in-Training*

Goal as a Flying Officer and Getting Those Silver Wings

No. 40 Catalog
Finest Model Airplane Catalog ever published. Large beautiful action display shots. Describes complete C-D Line and supplies
Only 5c (None Free)

Cleveland Master Models (in Kit form) have been painstakingly designed to ¾" scale and embody an amazing amount of "nowhere else procurable" authentic detail—the result of Cleveland's 23 years research to produce the finest models possible.

Cleveland's Newly Adopted Emblem for Master Scale Models

Grumman "SKYROCKET"

America's twin motor 450-mile-per-hour "Terror of the Skies." It's spectacular! It's the envy of every model-builder! Both motors pull—and how! Span 31½". C-D Master Kit SF-75 ..... **$3.50**

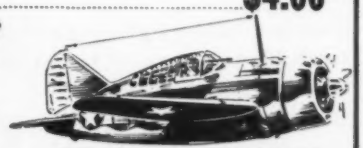
Super-detailed, "Super-charged" LOCKHEED P-38 "LIGHTNING"

Beautiful ¾" scale master miniature of "the world's fastest fighter." And C-D engineers have gone the limit in making this model as "terriffic" as the prototype. Loads of detail! Big 38¾" span. Super-powered twin-motor job that's speedy, realistic and an absolute "must" among model builders who want the best.
C-D Master Kit SF-85..... **$4.00**

More Hudson Bombers have been ferried overseas than any other plane.

Lockheed "HUDSON" Bomber ★

Called "Old Boomerang" by the British, for it always seems to come back. A powerful bomber, also used for reconnaisance and has done some fighting, too. Has seen plenty of action over Europe, Africa and the wide stretches of the Pacific. A "must" model among dyed in the wool modelbuilders.
Model Span is 49⅜".
C-D Master Kit SF-95..... **$7.50**



Brewster "BUFFALO"

Highly maneuverable and fast. Climbs 4,000 ft. per min. Speeds around 350 m.p.h. Nicknamed "Peanut Special." Model Span 26¼". C-D Master Kit SF-87 ..... **$3.00**

Curtiss "HELLDIVER"

Navy scout bomber, also dive bombs. Capable of blasting enemy war vessels with 500 or 700 lb. bomb. Span 25½". C-D Master Kit SF-80..... **$3.50**

Douglas SBD "DAUNTLESS"

The famous carrier dive bomber or scout widely employed by the U.S. Navy and Marine Corps. Known as the A-24 in the Army. World's hardest hitting dive bomber. Span 30⅝". C-D Master Kit SF-89..... **$3.50**

Cleveland Models Win More Compliments, More Prizes, More Honors Than Any Other Model Line in the World.

★ ★ ★ ORDERING INSTRUCTIONS ★ ★ ★

If your dealer can't supply you, send check or money order—cash at your own risk. Minimum order $1.00. No C.O.D.'s. Shipments to Canada or Mexico, add 10%. Foreign and Overseas Military Customers: P. O. regulations restrict shipments to Master Kits (up to & including $4.00 Kits) and Supplies under 18" in length, so please order no others. For service men still stationed in the U. S., we advise against using A.P.O. or Fleet P.O. box numbers to avoid usual delays because of parcel size restrictions. Use a local address near you if possible. Postal restrictions now prohibit any overseas shipments unless order is signed by a Commanding officer. Non-military customers may order from us only SF type kits retailing $2.50 to $4.00 without liquids as latter are not transmissible through the mail by boat. Deduct 75c from advertised price for this when making remittances, but include regular 10% foreign service charge. For P.P. Special Delivery in U. S. only add 25c. (Ohio residents only, add 3% sales tax.) All kit contents and prices subject to change or cancellation without notice. The usual C-D "Lightning Service" guaranteed—No Waiting—No. 40 Catalog 5c.

Cleveland Model & Supply Company, Inc.
World's Largest Manufacturers of Quality Model Aircraft—Since 1929
4508C30 Lorain Ave. ★ ★ Cleveland, Ohio, U. S. A.

MODELS

You're Building Models

and Mechanics of all classes in the Air Forces Build

★ Read ★ These Letters from "Men in the Air Forces"

"I've been in the AAF for the past 2 years. When we first reported for duty, many old timers thought we recruits didn't know a P-40 from an AT-6, nor know what made 'em fly. However, they didn't know that several of us were C-D modelbuilders! 13 years modelbuilding have taught me the principles of aerial flight, aeronautical engineering, airplane construction and identification."
J.M.G., AAF, Drew Field, Fla.

★ ★ ★

"Model building has helped me considerably in more ways than one—especially because it has developed a love for aircraft that makes my work and studies actually pleasure. At present I'm a Cadet in the Naval Air Corps, and the Vought-Sikorsky F4U is our pride and joy as it will probably be the ship we'll fly when ready for active duty. That's my choice of models if my letter is published."
A/C J.M. NAS, Oregon

★ ★ ★

"Yesterday I was flying models, today I am flying the real thing. I am now ready to graduate from advanced flying school, and get my commission, and as I look back over my rigid training, I can now realize how much my previous experience with models has really meant to me—I consider it a priceless education."
A/C L.M.S., AAF

★ ★ ★

"I'm a Naval Aviation Cadet now receiving advanced carrier instruction. Expect to be commissioned soon. I started building models when 12, and my first was your famous Great Lakes Trainer. I realize now how much that background of modelbuilding has helped me. I have stood very near the top in all my classes without conscious effort—thanks to those modelbuilding years."
A/C C.R.D., NAS, Jacksonville

FIGHTERS UNMASKED

Comparative fighting efficiency of front line pursuit planes and how to rate them accurately by a simple method

by ROBERT McLARREN

THOSE who witnessed the furor created by the recent controversy over the respective merits of the various military airplanes now in use by the warring nations were victimized to a large extent by the seeming authority of the statements published throughout the domestic and foreign press. These spokesmen made statements which were not only misleading but, in some cases, were actual gross misrepresentation of facts and such statements, having been taken to heart by civilians and the military alike, might easily have damaged morale in some cases and erroneously pacified it in others.

After lengthy study including the examination of outstanding military and manufacturing leaders, the Office of War Information released a rather complete analysis of American military airplanes which was, to a limited extent, an answer to the problem. However, the general tone of the report was that of an apology for the present comparative standing of America's warplanes with those of the enemy and our Allies. However, the report still left a question mark in regards to an actual comparison and an equation of efficiency.

Above Lockheed "Lightning" P-38, the most deadly fighter in the world (F.P.G.) *Below* North American P-51, the most efficient low altitude fighter.

The question has been answered in many quarters by statements, particularly those of military leaders, that the battleground was the only proving ground for military weapons and that the performance of our airplanes against those of the enemy would solve the question once and for all. This, obviously, is quite true. But it is an extremely costly and lengthy method. Certainly no comparison of military airplanes with those of the enemy they oppose can be made until a large number of battles have been fought and large numbers of planes destroyed on both sides. The tally, then, will tell the story. But certainly one engagement, or a dozen, or even half-a-hundred battles will not tell the actual story for the very next engagement may completely alter the picture. North African sand in a carburetor air intake, Aleutian ice on an elevator hinge, the lack of 100-octane fuel on Henderson Field or a diet of rice for six weeks in China may cause an American plane and its pilot to go down under the guns of an inferior enemy fighter. A blinding sun-ray, an over-revved engine or a broken fuel line may permit an American plane to destory a vastly-su-

perior enemy fighter. These eventualities make it quite evident that there is a real need for a method of evaluation of the various military airplanes and a basis of comparison affording an insight into the true tactical value of the various types now seeing action.

It must be borne in mind, however, that there can be no one magic formula which will equate a specified evaluation of an airplane into a single factor containing all of its countless merits and demerits and it must be understood clearly tht the method outlined herein gives only a rough approximation of such a factor. It is believed, however, that if it is used as a general "rule-of-thumb" formula, some conception of the respective merits of the types involved on the world's battlefronts may be gained.

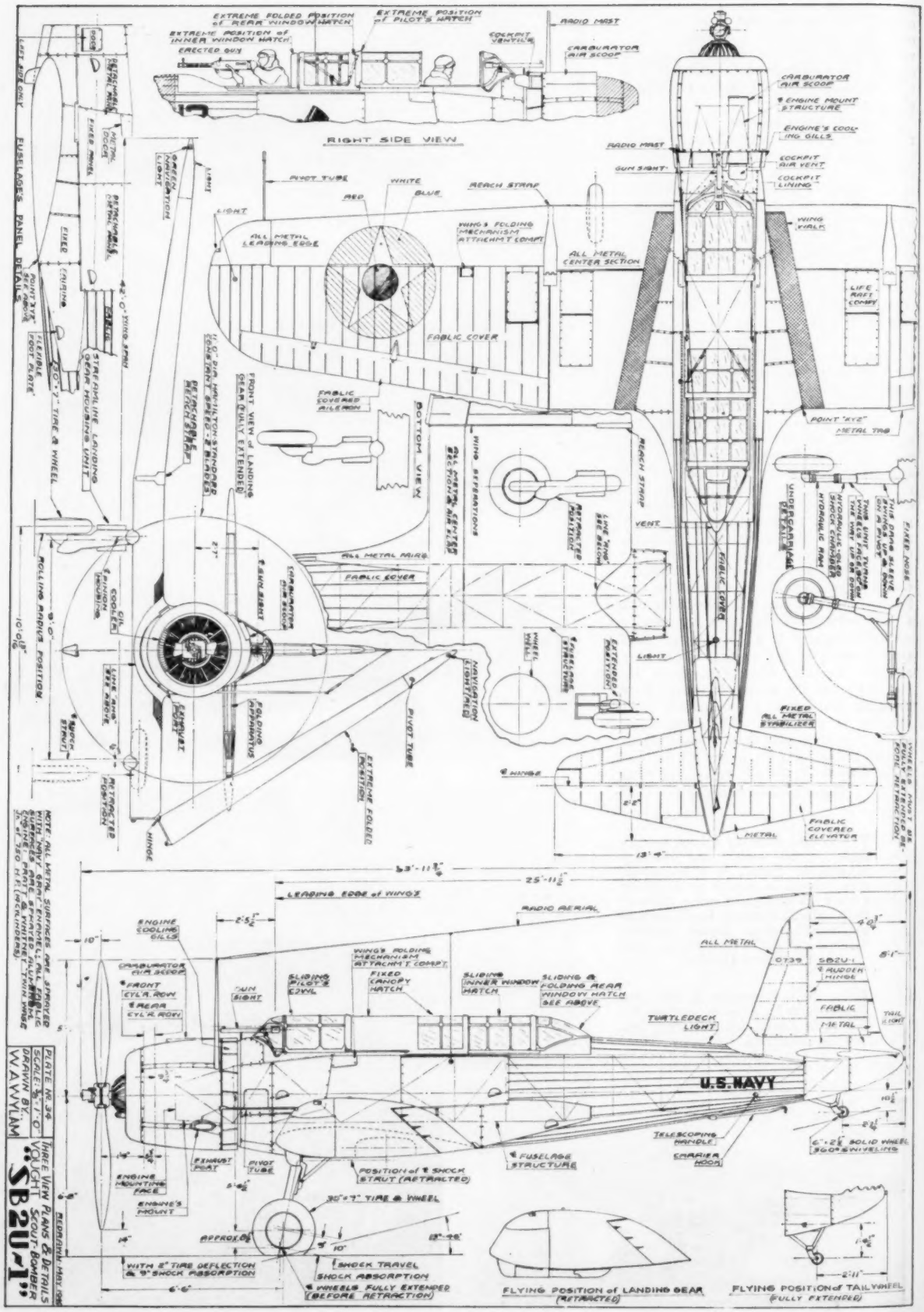
In order for an airplane to fly it must have an area of airfoil section exposed to the wind known as the "wing area" and a motivating force to pull it forward through the air. These two elements are used to lift the weight of an airplane and the performance of an airplane is dependent upon the ratio of these three factors. An airplane with a large wing area will be capable of supporting a greater weight than one with a small wing area should each plane have the same horsepower. A light airplane will fly faster and be more maneuverable than a heavy airplane with the same horsepower. And, quite obviously, the more powerful engine installed in two identical airplanes will pull the one through the air faster and higher than the other.

Flight capacity is a function of these three factors; when the power of the wing area is increased, flight capacity is increased; when the weight is increased or the other two factors are decreased, flight capacity is decreased. Therefore, flight capacity may be said to vary inversely as the wing loading (the weight of the airplane divided by the square feet of wing

(Continucd on page 56)

Top **Vought-Sikorsky fighter, world's fastest carrier plane.** *2nd from top* **Mitsubishi "Zero", it is maneuverable but rates poorly as a fighter (Acme Photo)** *3rd* **Curtiss "Hawk" P-40 a dreaded enemy in all parts of the world.** *Right* **British Hawker "Hurricane" ranks high among combat planes (Globe).**

Below **Bell Airacobra is fast and deadly with its 37 m.m. cannon.** *Below right* **Famed Messerschmitt No. 109 is outclassed by many Allied planes.**


RIGHT SIDE VIEW
BOTTOM VIEW
FRONT VIEW of LANDING GEAR (FULLY EXTENDED)
FLYING POSITION of LANDING GEAR (RETRACTED)
FLYING POSITION of TAILWHEEL (FULLY EXTENDED)
U.S. NAVY
"SB2U-1"
VOUGHT SCOUT-BOMBER
THREE VIEW PLANS & DETAILS
PLATE No. 34
SCALE: 3/16" = 1'-0"
DRAWN BY W.A.WYLAM
FUSELAGE PANEL DETAILS
FABRIC COVER
ALL METAL LEADING EDGE
ALL METAL CENTER SECTION
FABRIC COVERED AILERON
FIXED ALL METAL STABILIZER
FABRIC COVERED ELEVATOR
RADIO MAST
RADIO AERIAL
CARBURATOR AIR SCOOP
ENGINE'S COOLING GILLS
COCKPIT AIR VENT
COCKPIT LINING
WING WALK
LIFE RAFT COMPT.
GUN SIGHT
REACH STRAP
WING'S FOLDING MECHANISM ATTACHMT COMPT.
PIVOT TUBE
EXTREME FOLDED POSITION of REAR WINDOW HATCH
EXTREME POSITION of PILOT'S HATCH
EXTREME POSITION of INNER WINDOW HATCH
ERECTED GUN
COCKPIT CANOPY
FIXED CANOPY HATCH
SLIDING INNER WINDOW HATCH
SLIDING & FOLDING REAR WINDOW HATCH SEE ABOVE
TURTLEDECK LIGHT
TAIL LIGHT
FABRIC
METAL
ENGINE COOLING GILLS
CARBURATOR GUN SCOOP
FRONT CYL. A. ROW
REAR CYL. A. ROW
EXHAUST MANIFOLD
EXHAUST PIPE
EXHAUST BOOT
FOLDING APPARATUS
ENGINE MOUNTING FACE
ENGINE'S MOUNT
FUSELAGE STRUCTURE
CAMERA HOOD
TELESCOPING HANDLE
POSITION of ½ SHOCK STRUT (RETRACTED)
30" x 7" TIRE & WHEEL
APPROX. 8"
WITH 2" TIRE DEFLECTION & 9" SHOCK ABSORPTION
SHOCK TRAVEL SHOCK ABSORPTION
½ WHEELS FULLY EXTENDED (BEFORE RETRACTION)
6'-6"
63'-11½"
25'-11½"
LEADING EDGE of WING
42'-0" WING SPAN
13'-4"
2'-2"
2'-11"
6'-2½" SOLID WHEEL 360° SWIVELING
RETRACTABLE LANDING GEAR
STREAMLINE LANDING GEAR HOUSING UNIT
RETRACTED POSITION
EXTENDED POSITION
HINGE
METAL TAB
POINT "AYE"
NOTE: ALL METAL SURFACES ARE SPRAYED WITH DULL GRAY PAINT. ALL FABRIC SURFACES ARE PAINTED YELLOW. ENGINE: PRATT & WHITNEY "TWIN WASP" S1E-G OF 750 H.P. (GEARED).
REDRAWN MAY 1942

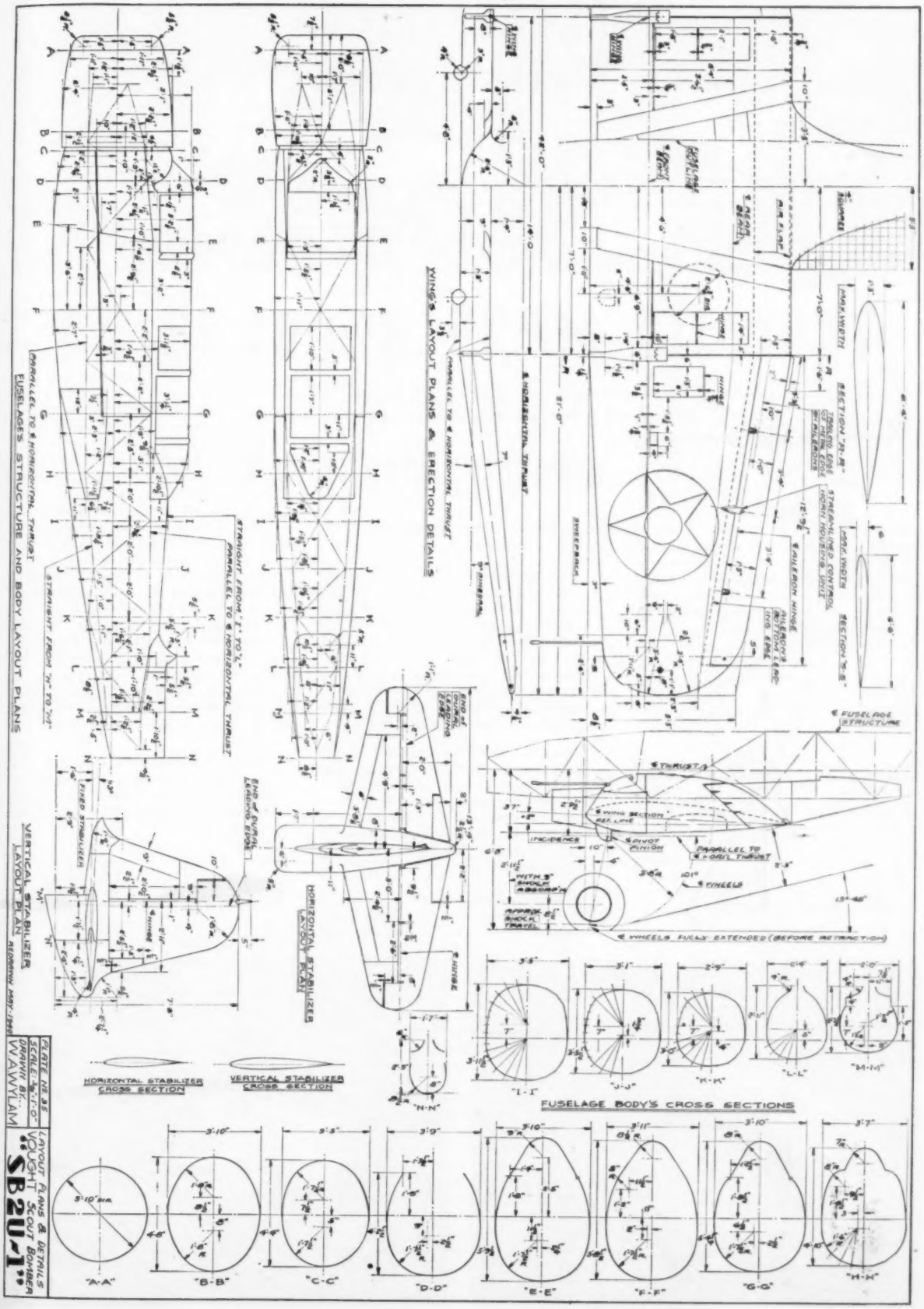
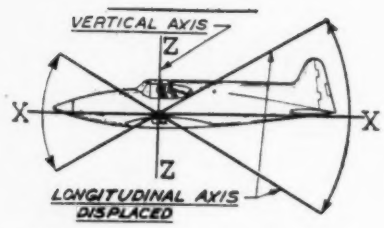


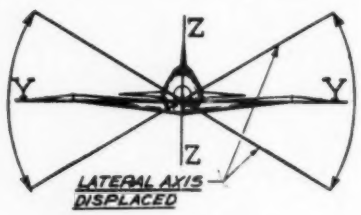
PLATE NO 25
SCALE: 1/4"=1'-0"
DRAWN BY
W.A.W.M.
LAYOUT PLANS & DETAILS
VOUGHT SCOUT BOMBER
SB2U-1
WINGS LAYOUT PLANS & ERECTION DETAILS
FUSELAGES STRUCTURE AND BODY LAYOUT PLANS
VERTICAL STABILIZER LAYOUT PLAN
HORIZONTAL STABILIZER LAYOUT PLAN
HORIZONTAL STABILIZER CROSS SECTION
VERTICAL STABILIZER CROSS SECTION
FUSELAGE BODY'S CROSS SECTIONS
"A-A"
"B-B"
"C-C"
"D-D"
"E-E"
"F-F"
"G-G"
"H-H"
"I-I"
"J-J"
"K-K"
"L-L"
"M-M"
"N-N"

PLANE TRICKS

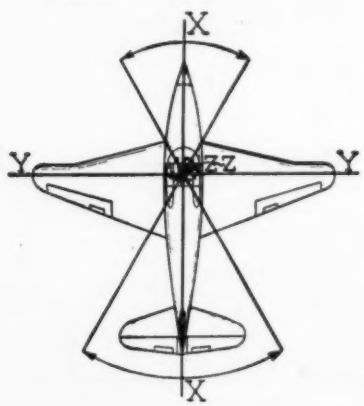
by ROBERT LLOYD BROWN



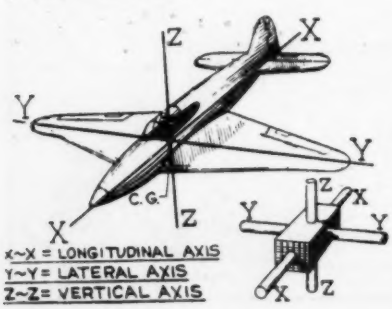
When an airplane is too sensitive to "pitching" (nosing up and down) it is said to be unstable longitudinally.



When an airplane is too sensitive to "rolling" (wing tip low or high) the plane is said to be unstable laterally (the lateral axis is moved out of horizontal position rotating about the longitudinal axis).



When an airplane is too sensitive to "yawing" (turning to right or left) the plane is said to be unstable directionally (the lateral axis and the longitudinal axis are displaced rotating about the vertical axis).



Stability Definitions

Automatic Stability—Stability depending upon movable control surfaces automatically operated by mechanical means.

Catastrophic Instability—A rare case, in a steep dive, in which the airplane may become entirely unmanageable, and even go so far as to become inverted while diving.

Dynamic Stability—The resulting stable position of an airplane produced by the oscillating air pressures set up by the fuselage (for example) rotating into an unstable position. Stability is restored after a series of air pressure oscillations.

Inherent Stability—Stability of an aircraft due solely to the arrangement of its fixed parts. The force which causes it, when disturbed, to return to its normal attitude of flight without the use of controls.

Neutral Stability—A neutrally stable airplane is one which, if once displaced from a state of steady flight, will not return to its original flight attitude, but will seek a state of steady flight in any new flight attitude. If the c.g. (center of gravity) is located in a central or neutral position no unbalanced forces exist. A neutrally stable airplane would, therefore, obviously crash.

Pendulum Stability—Stability due to a pendulum's center of weight acting at considerable distance below the center of lift. A parasol monoplane or pinotype wing mounted model airplane has marked pendulum stability because the c.g. is a considerable distance below the wing which lifts.

Editor's Note:—A low c.g. is one of the commonest ways of gaining longitudinal, or fore and aft stability, and works well on all *light slow* planes. However when the c.g. is low on heavy rubber or gas models great care must be used to have the c.l.a., or center of side projected area, on or below the line drawn through the c.g. parallel with the thrust line. The c.l.a. may be slightly above the c.g. but when far above, induces spiral diving, unless the ship is overpowered and adjusted when it flies under power so the nose points upward at all times. Under these conditions it spirals, but instead of diving, spiral climbs. If the nose of this type of ship drops below the horizontal flight position it spiral dives. In other words, a high c.l.a. such as will exist on very high-pylon models induces a spiral tendency. If any means are used to keep the nose pointed upward continually there will be no bad results, otherwise crashes will inevitably result.

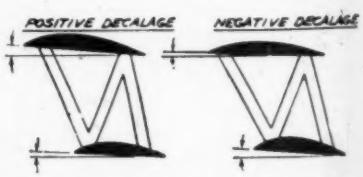
At best this is a precarious situation inasmuch as there is no assurance that a model, even when adjusted for a steep climb and with a powerful engine, will continually point its nose skyward. Several times at the Nationals, flights have been witnessed where a model had been adjusted for climb but due to air conditions nosed down into horizontal flight. In all such cases the model went into a tight spin or spiral dive. This was due to skidding on turns, producing a sudden pressure above the c.g., throwing the plane over into a steep bank and with ever-increasing speed this disturbing moment built up until the plane crashed.

Corrections for spiral diving can be easily made, even in the case of high-pylon models, by giving negative thrust (that is, slanting the thrust line downward at the nose), and by placing the fin area well below the thrust line. This lowers the c.l.a. and induces a roll in turns that resists spiralling.

Another good way to correct spiral instability is to increase the dihedral, provided that in doing so steps are taken to *lower the c.l.a. on a level with the c.g.* Merely increasing the dihedral without taking this latter precaution usually doesn't improve spiral stability and may increase spiral instability. The area of the fin relative to the dihedral is an important factor. If the fin is too large, spiralling will result.

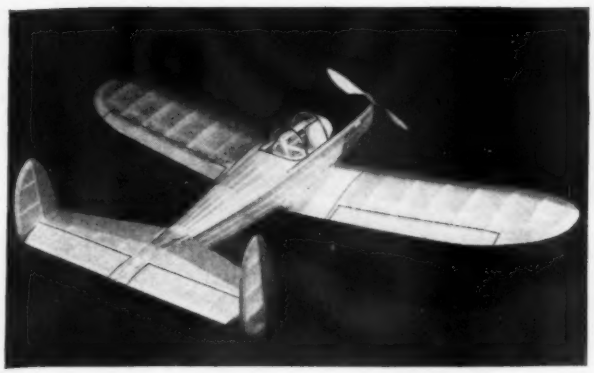
Static Stability—If a disturbed position of the airplane is corrected by an unbalanced force such as the c.g., the airplane is considered to be statically stable.

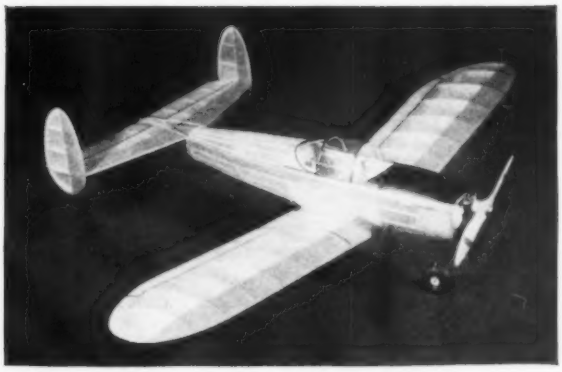
Longitudinal Dihedral—Angular difference between stabilizer incidence setting and wing incidence setting. If stabilizer has greater incidence than wing, the difference in angular settings is negative.



Decalage—The angular difference in incidence setting of the wings of a biplane. It is positive if upper wing has greater incidence.

VICTORY.





AN ERCOUPE FROM LILLIPUT

A stable low-wing scale sportplane with unusual flying ability that is easy to build

by **SYDNEY STRUHL**

JUST prior to the United States' entry into this second World War the lightplane activities in this country was on a terrific upswing. Second-hand planes sold as cheaply as autos and plane manufacturers were offering flight instructions with every new ship purchased. Things were boomin'. Then along came the war and with it all the necessary restrictions and regulations needed for our defense. Aircraft manufacturing turned its full attention to getting the best equipment out to get this war over as soon as possible. And that is as it should be.

All this adds up to the stalemating of lightplane activities for the duration, but with the promise of great advancement after the war.

One of the newest and finest lightplanes to be produced is the Ercoupe. The Ercoupe is a two place airplane ideally suited for transportation or training. Of the $2,000 class, the Ercoupe looks more like a snappy military pursuit job than a sportplane. Unusual points of interest in the ship is the tricycle landing gear, twin rudders and practically all metal construction.

Perhaps the most important feature of the Ercoupe is its ease of handling and performing. The Ercoupe is certified by the Civil Aeronautics Authority as "characteristically incapable of spinning." And the ship does have amazing stability—it will not get out of control. Even with the wheel full back, straight flight can be maintained or turns performed at will. It is absolutely impossible to spin the ship. The quick takeoff run, fast climb and high sustained cruising speed of the Ercoupe provides point-to-point transportation which will surprise and please the private pilot. On the ground as in the air, the plane handles with great ease; no nose-overs are possible even with full application of the hydraulic brakes.

Top **Top views of the finished plane showing trim lines, realistic appearance and large stabilizer that gives steady flight.** *Below left* **The uncovered frame shows simple construction.** *Below right* **Units are quickly dissembled for transportation.**

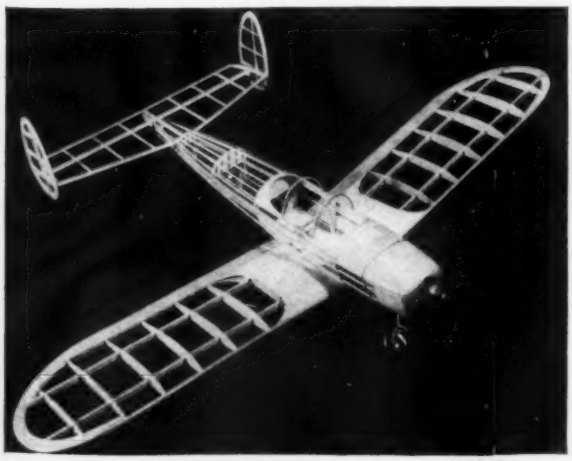
The Ercoupe's structure is all metal, as is the covering of all but the outer wing panels. The use of corrosion-resistant aluminum alloys in structure and covering brings to the lightplane pilot the dependability and freedom from maintenance of the large transport planes.

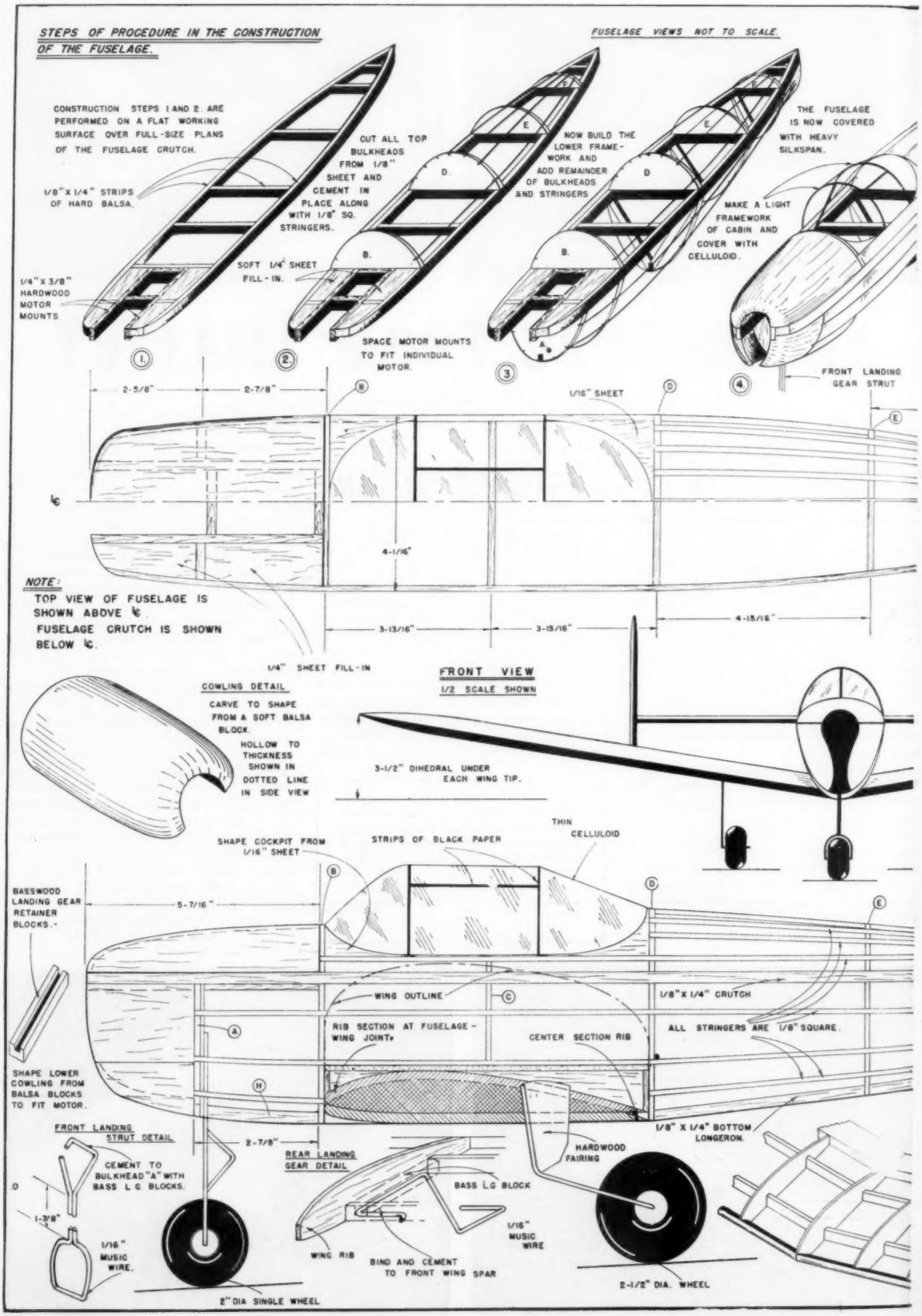
Powered with the Continental A-65 engine, the plane has remarkable performance with surprising economy. Maximum speed is 117 mph and cruising speed is 105 mph. Cruising range is 350 miles and the landing run is only 200 feet. Fuel consumption is but 4 gal. per hour.

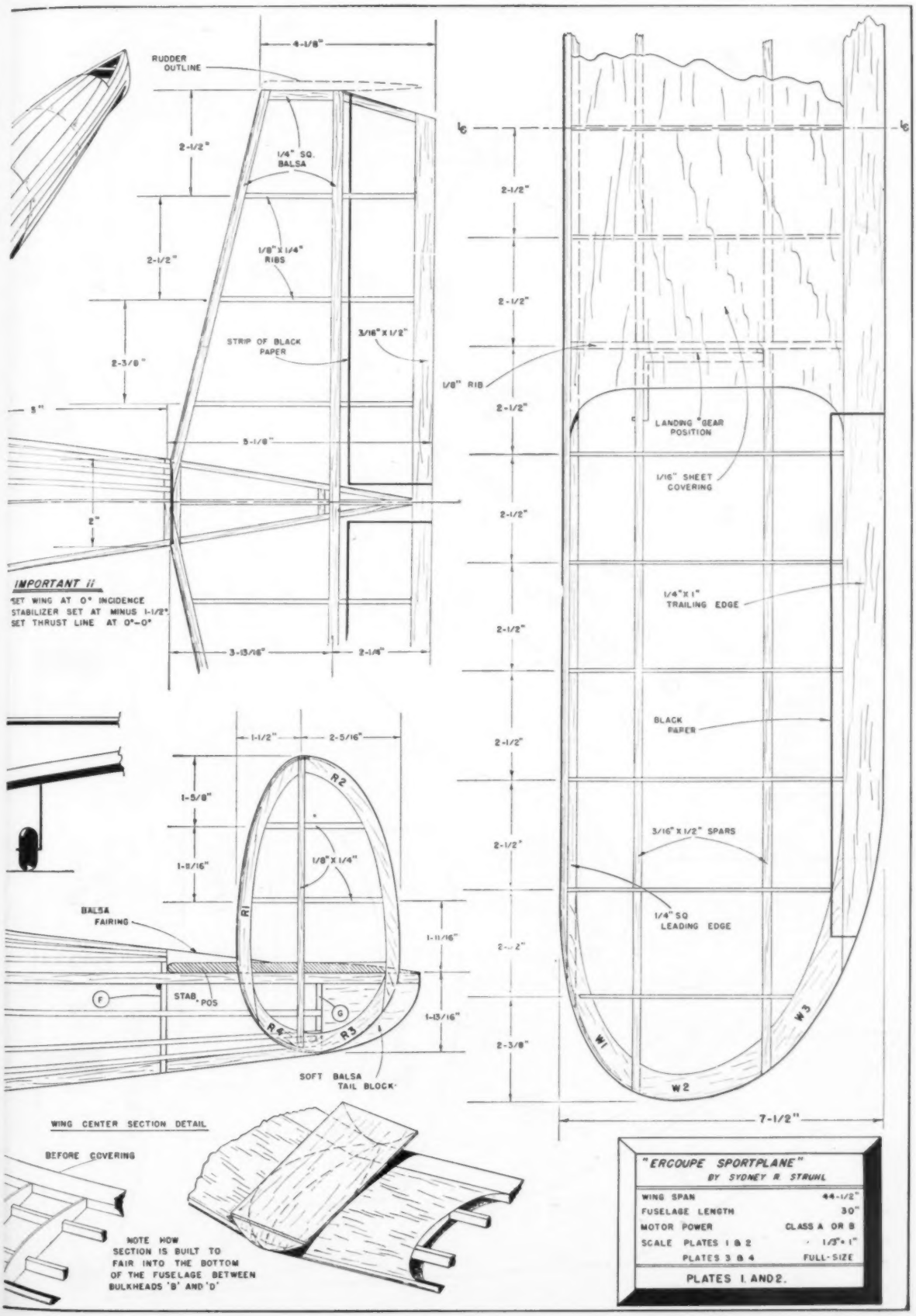
As a scale gas model we claim that the Ercoupe performs just as well as any other model even thought it is a low-wing design. You know that a low-wing model can be designed to fly just as well as any parasol model if certain aerodynamic principles are observed; such as the proper distribution of your forces (C.G., C.L.A., C.P.) and the correct setting of attack of the plane and thrust line.

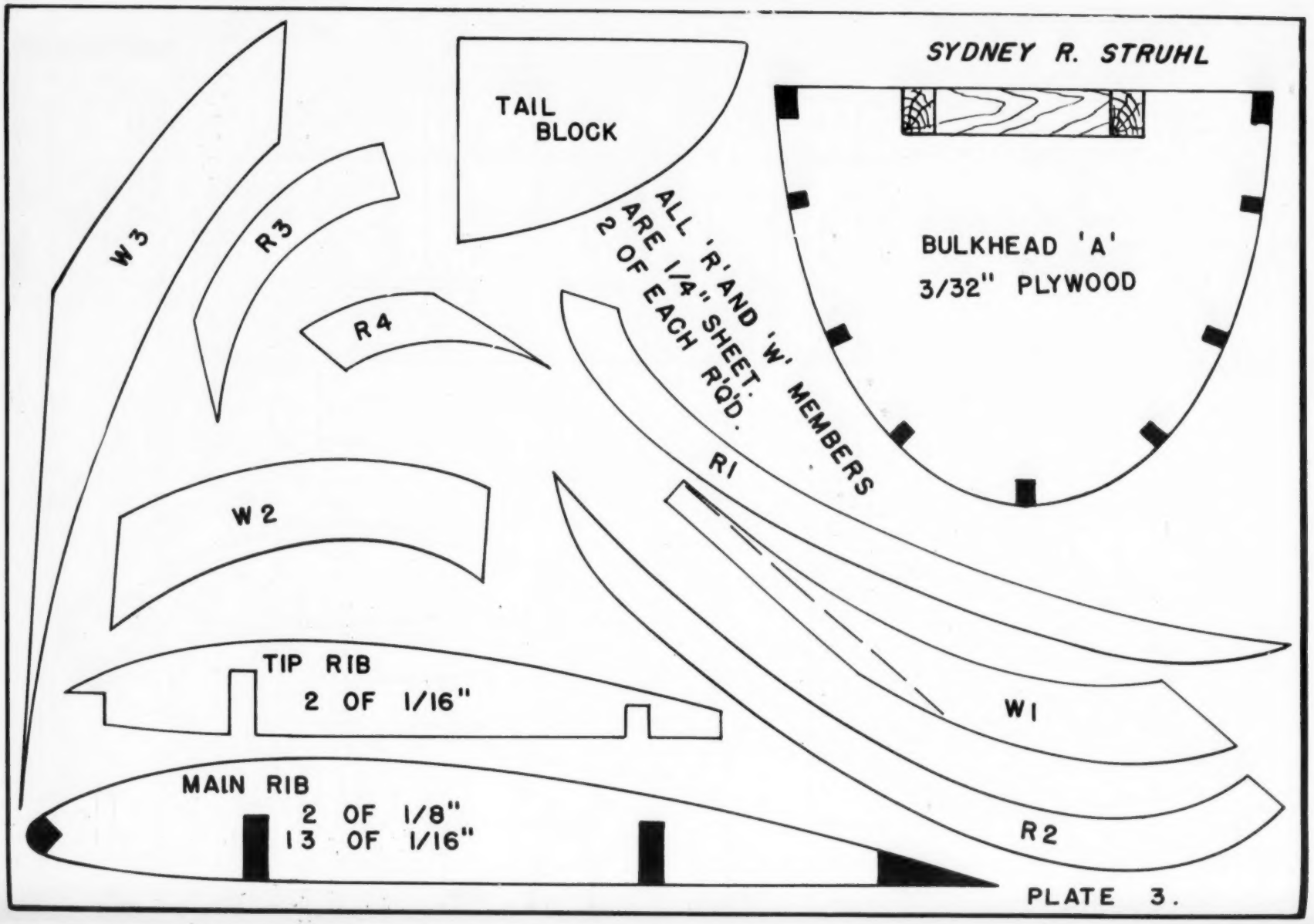
Since all forces are designed into the

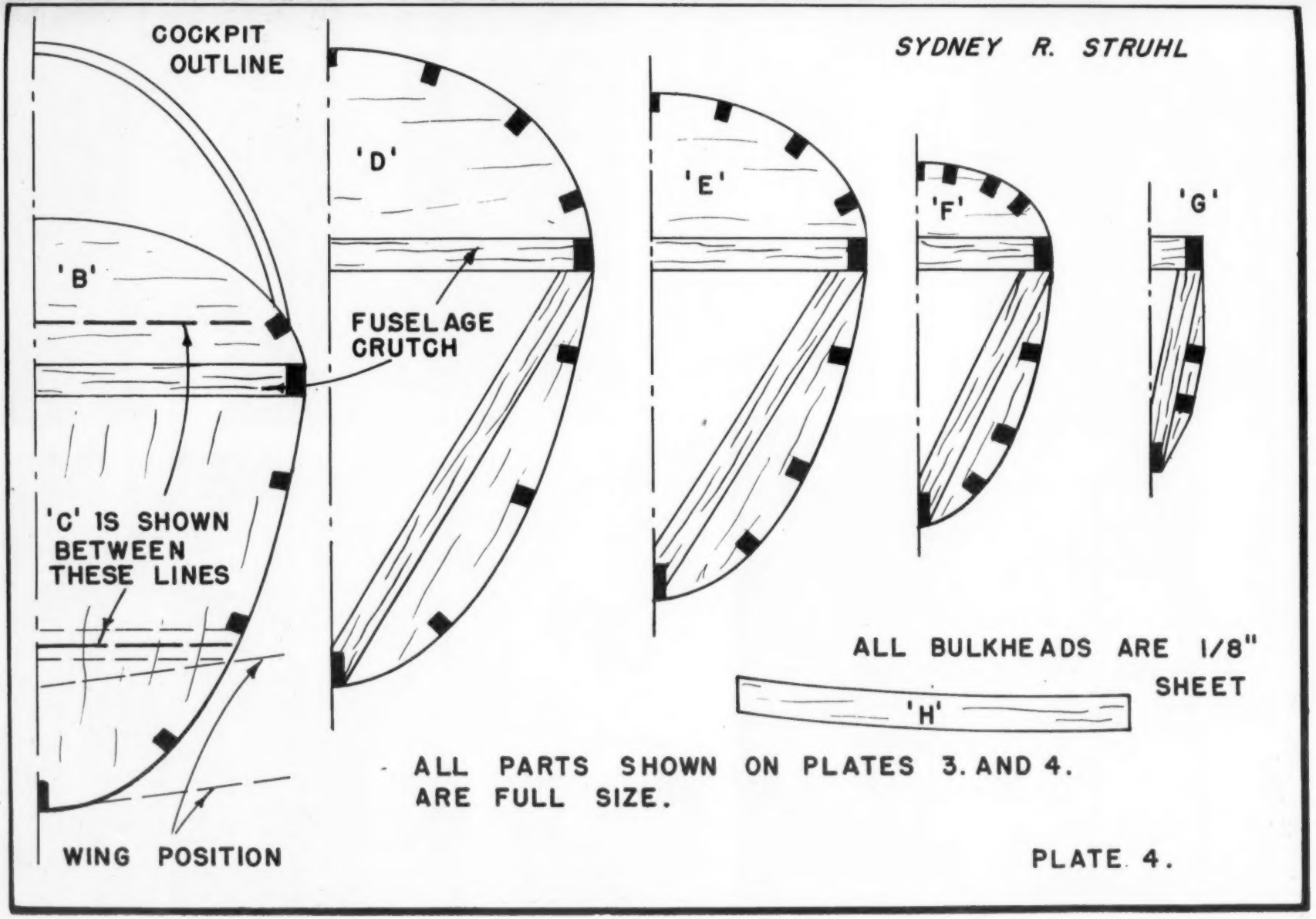
(Continued on page 40)




STEPS OF PROCEDURE IN THE CONSTRUCTION OF THE FUSELAGE.
FUSELAGE VIEWS NOT TO SCALE.
CONSTRUCTION STEPS 1 AND 2 ARE PERFORMED ON A FLAT WORKING SURFACE OVER FULL-SIZE PLANS OF THE FUSELAGE CRUTCH.
1/8" X 1/4" STRIPS OF HARD BALSA.
1/4" X 3/8" HARDWOOD MOTOR MOUNTS
CUT ALL TOP BULKHEADS FROM 1/8" SHEET AND CEMENT IN PLACE ALONG WITH 1/8" SQ. STRINGERS.
SOFT 1/4" SHEET FILL-IN.
SPACE MOTOR MOUNTS TO FIT INDIVIDUAL MOTOR.
NOW BUILD THE LOWER FRAME-WORK AND ADD REMAINDER OF BULKHEADS AND STRINGERS
MAKE A LIGHT FRAMEWORK OF CABIN AND COVER WITH CELLULOID.
THE FUSELAGE IS NOW COVERED WITH HEAVY SILKSPAN.
FRONT LANDING GEAR STRUT
1
2
3
4
2-5/8"
2-7/8"
1/16" SHEET
4-1/16"
3-13/16"
3-13/16"
4-15/16"
NOTE:
TOP VIEW OF FUSELAGE IS SHOWN ABOVE ℄.
FUSELAGE CRUTCH IS SHOWN BELOW ℄.
1/4" SHEET FILL-IN
COWLING DETAIL
CARVE TO SHAPE FROM A SOFT BALSA BLOCK.
HOLLOW TO THICKNESS SHOWN IN DOTTED LINE IN SIDE VIEW
FRONT VIEW
1/2 SCALE SHOWN
3-1/2" DIHEDRAL UNDER EACH WING TIP.
SHAPE COCKPIT FROM 1/16" SHEET
STRIPS OF BLACK PAPER
THIN CELLULOID
BASSWOOD LANDING GEAR RETAINER BLOCKS.-
5-7/16"
WING OUTLINE
1/8" X 1/4" CRUTCH
RIB SECTION AT FUSELAGE-WING JOINT.
CENTER SECTION RIB
ALL STRINGERS ARE 1/8" SQUARE.
SHAPE LOWER COWLING FROM BALSA BLOCKS TO FIT MOTOR.
1/8" X 1/4" BOTTOM LONGERON.
FRONT LANDING STRUT DETAIL.
CEMENT TO BULKHEAD "A" WITH BASS L.G. BLOCKS.
1-7/8"
1/16" MUSIC WIRE.
2" DIA SINGLE WHEEL
2-7/8"
REAR LANDING GEAR DETAIL
WING RIB
BIND AND CEMENT TO FRONT WING SPAR
BASS L.G. BLOCK
1/16" MUSIC WIRE
HARDWOOD FAIRING
2-1/2" DIA. WHEEL


RUDDER OUTLINE
4-1/8"
2-1/2"
1/4" SQ. BALSA
2-1/2"
1/8" X 1/4" RIBS
STRIP OF BLACK PAPER
3/16" X 1/2"
2-3/8"
5"
5-1/8"
2"
IMPORTANT !!
SET WING AT 0° INCIDENCE
STABILIZER SET AT MINUS 1-1/2°
SET THRUST LINE AT 0°-0°
3-13/16"
2-1/4"
1/8" RIB
LANDING GEAR POSITION
1/16" SHEET COVERING
1/4" X 1" TRAILING EDGE
BLACK PAPER
3/16" X 1/2" SPARS
1/4" SQ LEADING EDGE
W1
W2
W3
7-1/2"
1-1/2"
2-5/16"
1-5/8"
1-11/16"
1/8" X 1/4"
R1
R2
R3
R4
BALSA FAIRING
STAB. POS
F
G
1-11/16"
1-13/16"
SOFT BALSA TAIL BLOCK
WING CENTER SECTION DETAIL
BEFORE COVERING
NOTE HOW SECTION IS BUILT TO FAIR INTO THE BOTTOM OF THE FUSELAGE BETWEEN BULKHEADS 'B' AND 'D'
"ERCOUPE SPORTPLANE"
BY SYDNEY R. STRUHL
WING SPAN 44-1/2"
FUSELAGE LENGTH 30"
MOTOR POWER CLASS A OR B
SCALE PLATES 1 & 2 1/3" = 1"
PLATES 3 & 4 FULL-SIZE
PLATES 1 AND 2.


SYDNEY R. STRUHL
TAIL BLOCK
W3
R3
R4
ALL 'R' AND 'W' MEMBERS ARE 1/4" SHEET. 2 OF EACH R'Q'D.
BULKHEAD 'A'
3/32" PLYWOOD
R1
W2
TIP RIB
2 OF 1/16"
W1
MAIN RIB
2 OF 1/8"
13 OF 1/16"
R2
PLATE 3.


SYDNEY R. STRUHL
COCKPIT OUTLINE
'B'
'C' IS SHOWN BETWEEN THESE LINES
WING POSITION
'D'
FUSELAGE CRUTCH
'E'
'F'
'G'
ALL BULKHEADS ARE 1/8" SHEET
'H'
ALL PARTS SHOWN ON PLATES 3. AND 4. ARE FULL SIZE.
PLATE 4.

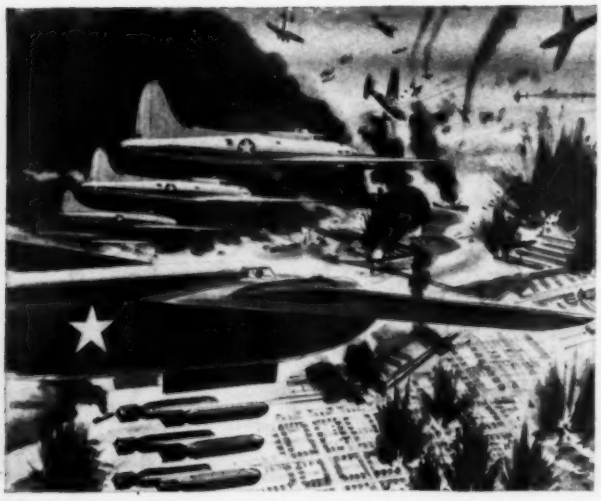
FRONTIERS

Air war from all parts of the world

THE prediction and dream of General "Billy" Mitchell is being wrought in the forge of modern combat. Every battle so far has been won because of the part played by airpower; no army or navy force today can win without it.

The Battle of Midway was primarily an action of airpower against air and naval power; American airpower destroyed the Jap planes, consequently their surface craft were at the mercy of the American planes. In Egypt Montgomery won because he gained control of the air. In the Solomons we are holding Guadalcanal and extending our footholds in that region because our airplanes are supreme.

This does not mean that airpower can do the whole job but merely that without it defeat is certain when engaged with an enemy who has airpower.



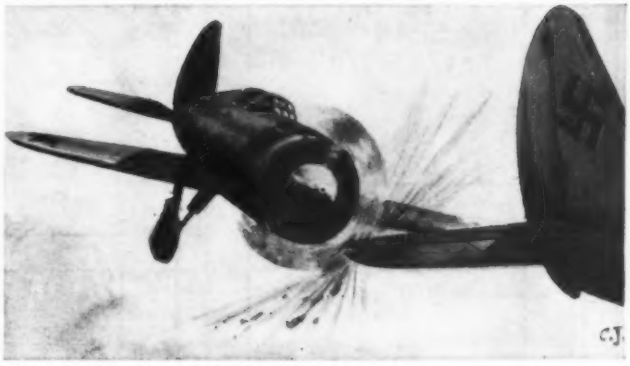
A few of the latest planes and developments participating in this great modern drama are shown in these pages.

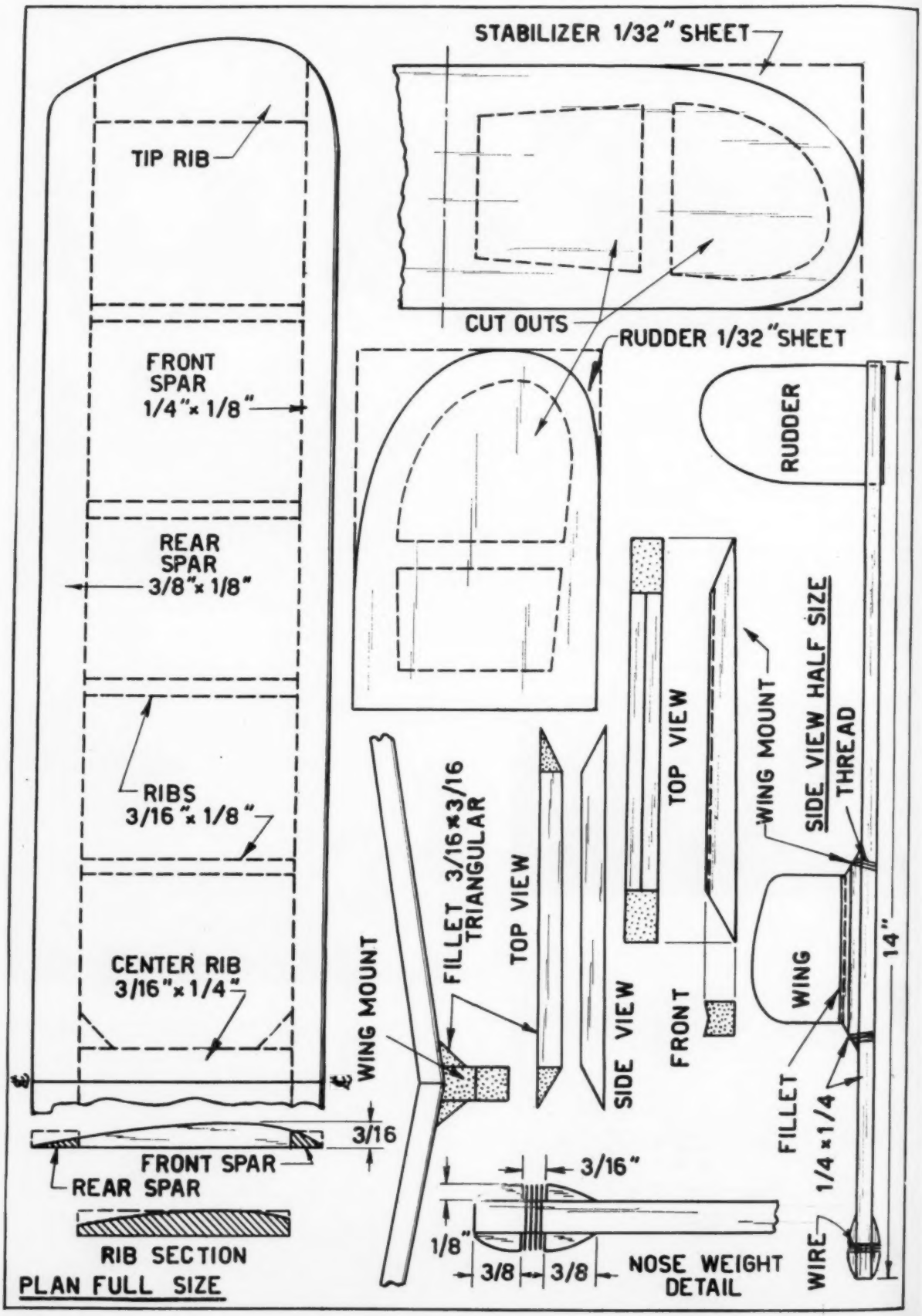
First, above, you see one of the latest military transport and cargo planes, a modification of the Consolidated Liberator B-24. It can carry more than 10 tons of cargo and has a range of more than 10,000 miles with a speed of 300 mph. or more. In many parts of the world air transport is replacing or supplementing transport by sea.

The 2nd picture from the top, page 16, shows the powerful four engine Russian bomber that brought Mr. Molotov from Moscow to the United Kingdom to sign a mutual assistance pact between Great Britain and Soviet Russia some time ago. The power and modern design of this air giant is obvious from a glance; it is a tremendous ship, as indicated by the people standing beneath it.

Transportation of war materials and supplies to Russia, Great Britain and other fronts has presented an almost insurmountable problem because of U-boat attacks on con-

(Continued on page 38)




STABILIZER 1/32" SHEET
TIP RIB
CUT OUTS
RUDDER 1/32" SHEET
FRONT SPAR 1/4" x 1/8"
REAR SPAR 3/8" x 1/8"
RUDDER
RIBS 3/16" x 1/8"
CENTER RIB 3/16" x 1/4"
WING MOUNT
FILLET 3/16 x 3/16 TRIANGULAR
TOP VIEW
SIDE VIEW
TOP VIEW
FRONT
WING MOUNT
SIDE VIEW HALF SIZE
THREAD
WING
14"
FILLET 1/4 x 1/4
3/16
FRONT SPAR
REAR SPAR
RIB SECTION
PLAN FULL SIZE
3/16"
1/8"
3/8
3/8
NOSE WEIGHT DETAIL
WIRE

MODELING YOUR FUTURE IN AVIATION

Official Air Youth course in elementary aeronautics

by

CHARLES H. GRANT

LESSON 9

Planning and building an elementary contest glider

THE first model described in this series of articles was the "bird glider," designed with the proportions and contours of a real bird. For stability and control the bird moves its wings and tail, thereby retaining balance. However the wings and tail surfaces of a model glider necessarily must be rigid. This deprives it of the required stability unless tail surfaces are much larger than a bird's or are placed farther to the rear of the wing; because longitudinal, or fore and aft stability is proportional to the stabilizer (horizontal tail surface) area times its distance from the wing center (stabilizer moment arm).

The distance from wing to stabilizer in the bird glider was kept constant to retain bird proportions, so tail surfaces were increased in area to provide required stability. However, only sufficient area to give it minimum stability was possible without making the tail excessively large.

Plans and description of other gliders patterned from full scale planes followed the bird glider. These, too, had minimum longitudinal stability, when made to the exact scale of the large plane. Though the moment arm was much longer the tail surfaces were small for complete stability, because they were fixed and not movable for purposes of balance like man-carrying planes. To produce the stabilizing or control effect of movable horizontal tail surfaces, fixed stabilizers must be at least two-thirds larger.

Though in several glider designs the tail planes were enlarged slightly from exact scale, to increase longitudinal stability, but were smaller than required for complete stability.

So in the designs of both bird glider and gliders built to scale of large planes, stability was sacrificed to retain scale proportions. This usually occurs whenever flying models are built to exact scale of large planes.

When stability and flight efficiency alone are sought, design proportions must be dictated solely by aerodynamics and not by some particular structural pattern; some full scale airplane or bird.

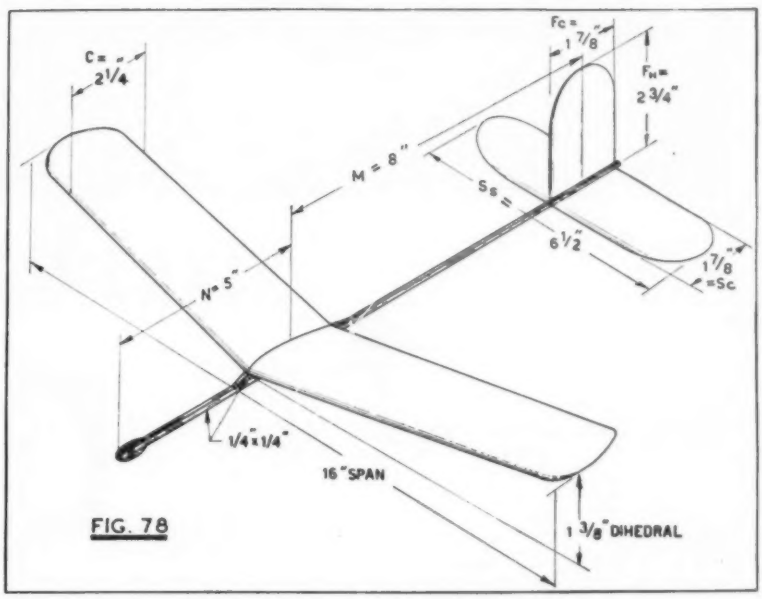


FIG. 78

What are the basic proportions for an efficient and stable glider? Let us design one and see. The starting point or basic measurement is always the *wing span* because all other airplane measurements must be proportionate to it. (Span is the distance from one wing tip to the other.) To keep construction simple and cost low, the glider should be of moderate size: a wing span, S, of 16 inches is satisfactory. Less than this makes flight erratic and adjustment difficult.

The next feature to consider is length of *wing chord*, the distance from the leading or front edge of the wing to the trailing or rear edge. An average value is about 1/7 the wing span, so wing chord, C, is 2-1/4 inches. This relation between span and chord is called "aspect ratio" and is represented by:

$$\frac{\text{Span}}{\text{Average Chord}} = \frac{S}{C} = \frac{16}{2.25} = 7.1$$

Location of the tail planes is determined next: the moment arm, M, must be long enough to provide stability without excessively large tail surfaces. A length equal to 1/2 the wing span is standard, so *tail moment arm*, $M = \frac{16}{2} = 8''$, = distance from wing center to center of the stabilizer.

Now the stabilizer size and proportions for complete longitudinal stability must be established. *Stabilizer span* S_s = (0.4) × *wing span* S = 6.4". *Stab. chord* C_s = (0.85) × *wing chord* C or $C_s = 1.9''$. This gives a *stabilizer area* A_s of 12.16 sq. in. When the tips are rounded as shown on the plans, area will be about 2 sq. in. less or 10.16 sq. in. As a basic rule, stabilizer area of a glider should be about 30% of the wing area. The wing area is 36 sq. in. less 2 sq. in. for rounded wing tips, or 34 sq. in.; so the stabilizer area of this glider is just 30% of the wing area.

Fin proportions are governed by the wing as the wing alone causes directional instability which the fin controls. However stabilizer measurements are also proportional to the wing, so fin measurements may be determined relative to stabilizer span and chord. *Fin height* is (0.43) of stabilizer span S_s, or $F_H = 2\text{-}3/4''$. Fin chord C_F is the same as the stabilizer chord, or $C_F = 1.9''$. The tip is rounded similarly to the stabilizer tips as shown in the plans. The total fin area A_F is then 4.2 sq. in., allowing for 1 sq. in. being cut away by rounding the tip. This is 12% of the wing area, the correct value for all gliders and rubber powered models.

The *nose length*, N, is the distance from the wing center to the forward tip of the frame stick, body or fuselage, and should be approximately (0.62) of the moment arm, M, which is 8", so $N = 5''$. If pre-

(Continued on page 59)

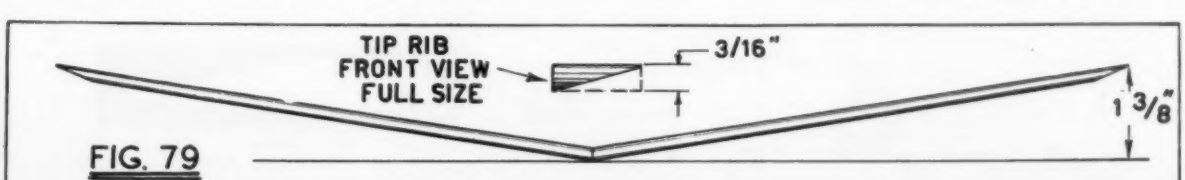
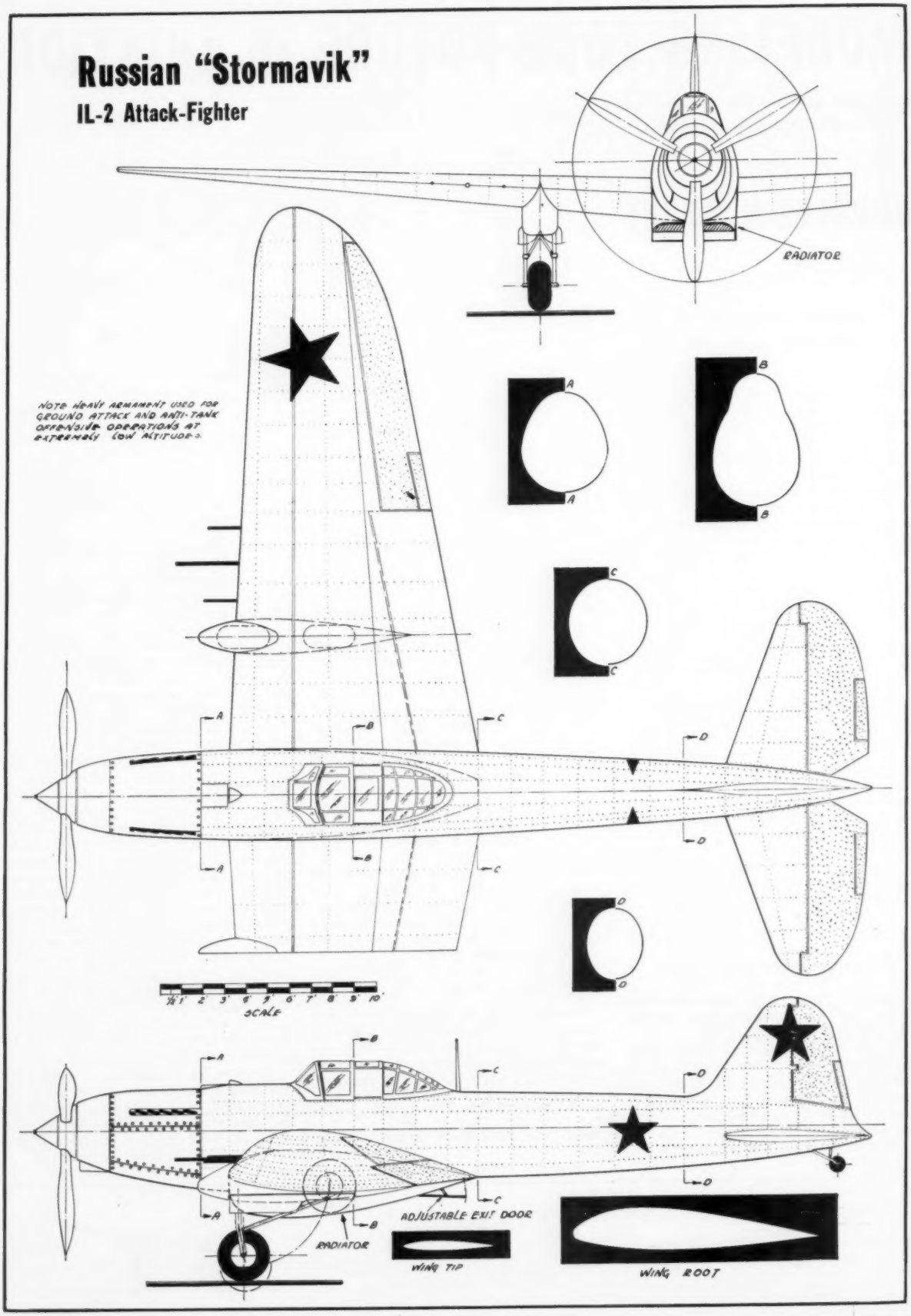


FIG. 79

Copyright 1943 by Charles Hampson Grant

Russian "Stormavik"

IL-2 Attack-Fighter



SOVIET STORMAVIK

The plane on the cover

WHEN Hitler attacked Russia on June 22, 1941, his Luftwaffe was primed for a murderous attack upon the hastily assembled Red Air Fleet and a quick defeat of the supposed innoffensive and antiquated force defending the largest land on Earth. Field Marshal Goering had laid tactical plans for a quick mopping-up of the Russians by his fighter planes, clearing the way for his bombers in their attack upon the Soviet's centers of industry and population. Met by the crushingly superior power of the Nazis, the Red Air Fleet was staggered by blow after blow upon its planes, men and equipment. By September the Luftwaffe had undisputed control of the air over the Central Front and the land armies were pouring across fields and marshes in seemingly never-ending numbers. Autumn found Hitler knocking at Moscow and the world stared wide-eyed at Russia's impending collapse. But Hitler and the world had not reckoned with the staunch fibre of the Russian soldier.

Winter embraced the Central Front in its frigid grasp and the lines froze almost into silence. With this, the greatest of nature's military aids, to give them respite the Russians set about the giant task of creating an organized force to defend its capital and its lands. Few men knew, or could even guess, the actual size of the Russian Army or Air Force prior to war, but the power and the speed of Hitler's attack had crushed this force, regardless of its size, and had driven it back until snow and freezing temperatures had stopped him. Hastily, but with obviously good and long planning, Russian heavy industry, including the aircraft industry, was moved East of the Ural Mountains and there set into action.

The Winter of 1941 saved Moscow and the Russian armies and gave birth to one of the world's largest military production machines. With the coming of Spring and renewal of Nazi onslaught, the first of the newer Russian flying machines went into action, flinging themselves at the surprised Luftwaffe pilots like savage hunting dogs.

Soviet fighting airmen became a thing of dread before Moscow and such actions as that of Captain Gastello, who drove his flaming plane into a German troop column blowing up tanks and armoured cars, and Major Borokovich, who smashed his weaponless fighter into a Nazi bomber in mid-air, became legend from one end of the Front to the other.

Air action centered about Moscow and Goering threw his very best into the fray, including the Heinkel He-115 fighter which he had not found necessary to use in the Battle of Britain. But the Russians met the challenge and shot them as well as the Messerschmitts and Junkers out of the air as fast as they crossed the lines. The Stuka became a pitiful flying coffin for Luftwaffe students and its success in Poland, France and Greece became a mere mockery before the flaming guns of the mighty MIG-3 and I-16B fighter planes of the Soviets.

After incessant demands Italian planes were rushed into the fight, to be consumed in the growing Red Air Fleet, and were as hastily withdrawn. In the Spring of 1942 British and American planes began to arrive in quantity and Hurricane, Curtiss and Bell fighters under the skilled fighting hands of the Russian pilots, who had been baptized in the Spanish revolution and initiated before Moscow, lashed at the enemy with unbelievable power and strength.

The cream of the Luftwaffe staggered under the avalanche and fell back to other fronts. And since the Fall of 1942, the Russians have held air superiority over the Germans on all fronts for the majority of the period.

In the very teeth of the battle rode a plane which the Germans hastened to call "Schwarze Tod" or "Black Death" and to dread it above all others which might attack their aerodromes, troop columns and supply dumps. The Russians, themselves, named this plane the Stormavik, which we might easily assume means exactly what it says in English. And this ship, the IL-2, is our Plane on the Cover this month.

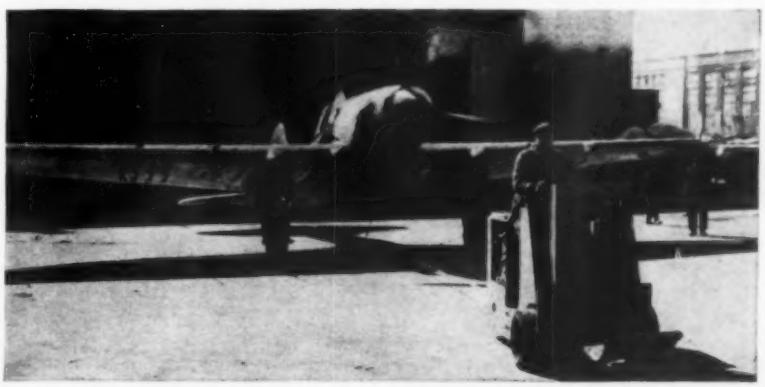
The Stormavik is an odd airplane in many respects and does not please the eye of more conventional pursuit plane designers. But it was built for one specific purpose and it has served that purpose well. The debate over whether or not an air force should be an adjunct of the ground forces or a separate entity unto itself was never a very great problem to the Russians; they simply designed certain planes to fulfill each of the two purposes. And the Stormavik was designed for extremely low-altitude ground cooperation work and no plane in the world is its peer in this one particular branch of air fighting.

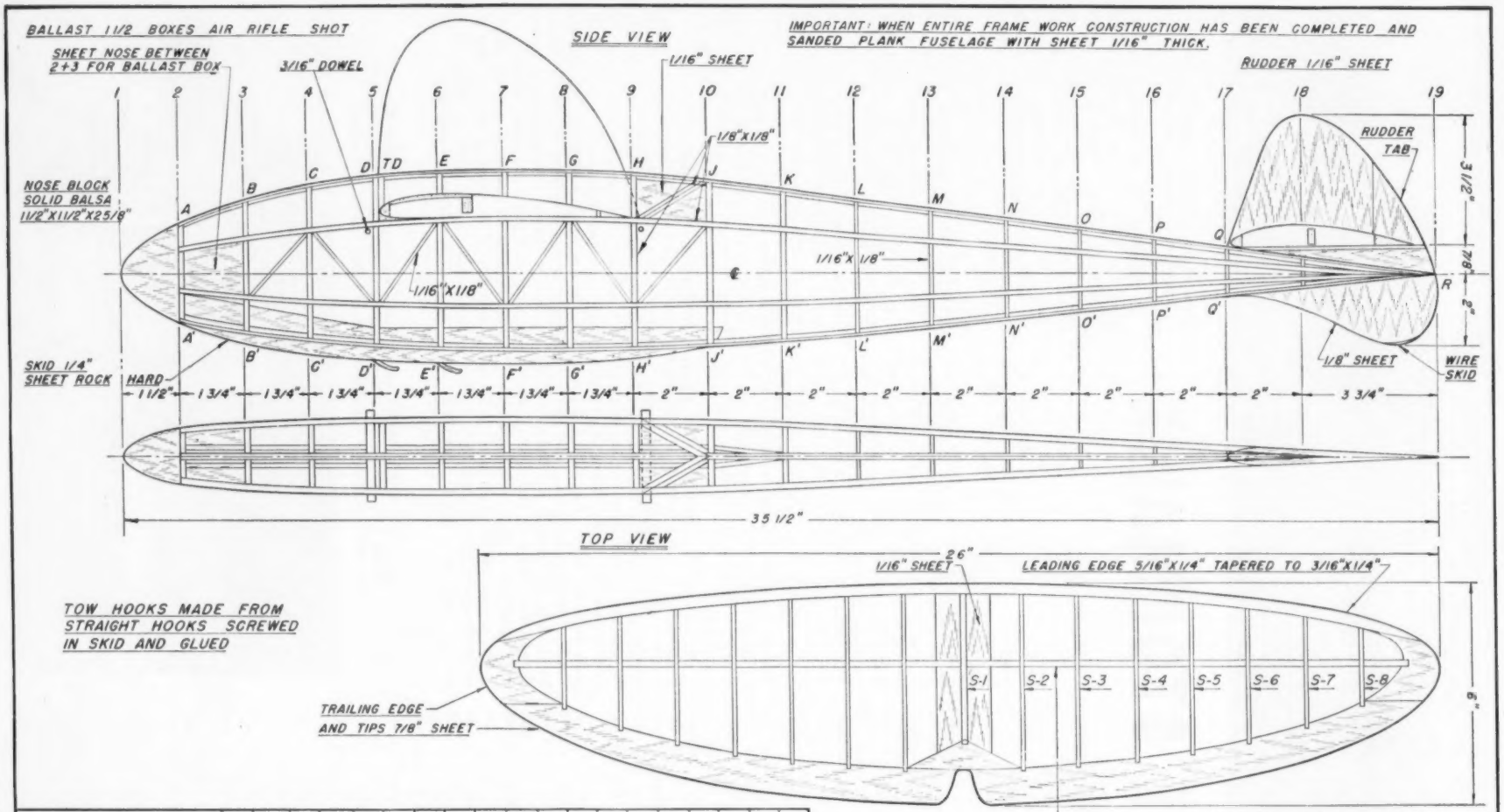
Although a single seater, the Stormavik is a comparatively large airplane of conventional layout, a low-wing full cantilever monoplane with retractable landing gear and single tail surfaces.

The fuselage is extremely long and built up on a framework of six heavy girders spaced by channel-type frames and covered with riveted aluminum skin. Structure is quite similar in design to several American types which were produced under the supervision of American engineers loaned

(Continued on page 52)

Above **Stormavik pursuit-bombers on the line ready for takeoff.** *Below* **Dragging the bird of prey from its nest. It is death on tanks, mounting 2 machine guns and two cannon. (Sovfoto)**




BALLAST 1 1/2 BOXES AIR RIFLE SHOT
SHEET NOSE BETWEEN 2+3 FOR BALLAST BOX
3/16" DOWEL
SIDE VIEW
1/16" SHEET
IMPORTANT: WHEN ENTIRE FRAME WORK CONSTRUCTION HAS BEEN COMPLETED AND SANDED PLANK FUSELAGE WITH SHEET 1/16" THICK.
RUDDER 1/16" SHEET
RUDDER TAB
1/8"X1/8"
NOSE BLOCK SOLID BALSA 1 1/2"X1 1/2"X2 5/8"
1/16"X 1/8"
1/16"X1/8"
3 1/2"
7/8"
2"
SKID 1/4" SHEET ROCK
HARD
1/8" SHEET
WIRE SKID
1 1/2" 1 3/4" 1 3/4" 1 3/4" 1 3/4" 1 3/4" 1 3/4" 1 3/4" 2" 2" 2" 2" 2" 2" 2" 2" 2" 3 3/4"
35 1/2"
TOP VIEW
26"
1/16" SHEET
LEADING EDGE 5/16"X1/4" TAPERED TO 3/16"X1/4"
TOW HOOKS MADE FROM STRAIGHT HOOKS SCREWED IN SKID AND GLUED
S-1 S-2 S-3 S-4 S-5 S-6 S-7 S-8
6"
TRAILING EDGE AND TIPS 7/8" SHEET
CENTER SPAR 7/16"X3/16" TAPERED TO 1/8"X3/16"

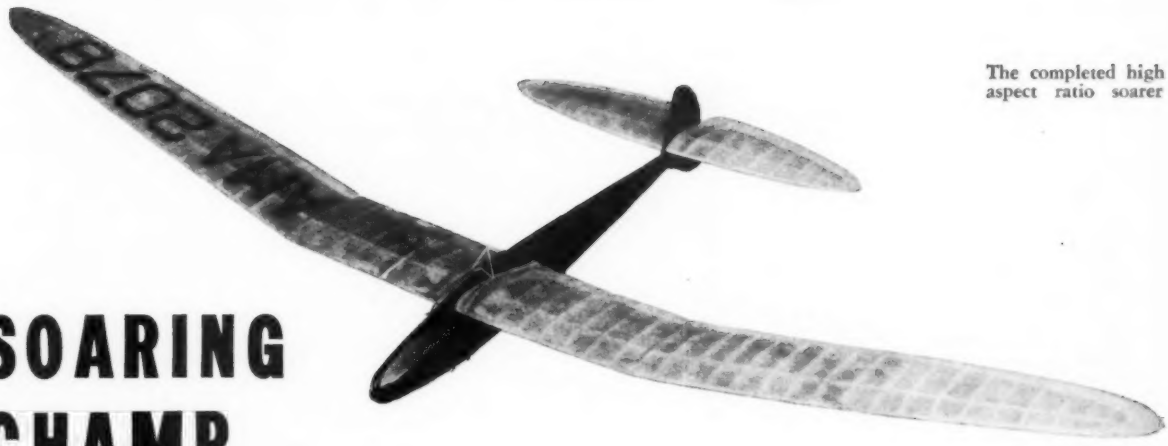
STATIONS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
℄ TO TOP LONGERON	X	11/16	1	1 3/16	1 3/8	1 7/16	1 7/16	1 7/16	1 3/8	1 5/16	1 3/16	1 1/16	15/16	3/4	5/8	1/2	3/8	1/4	0
℄ TO TOP STRINGER	X	1 7/16	2	2 3/8	2 5/8	2 3/4	2 3/4	2 3/4	2 11/16	2 1/2	2 5/16	2 1/16	1 13/16	1 1/2	1 1/4	1	3/4	1/2	0
℄ TO BOTTOM LONG.	X	7/16	3/4	7/8	15/16	1	1	1	1	15/16	7/8	13/16	3/4	5/8	9/16	1/2	3/8	1/4	0
℄ TO BOTTOM STRING.	X	1 1/4	1 5/8	1 15/16	2 1/16	2 3/16	2 1/4	2 3/16	2 3/16	2 1/8	1 15/16	1 3/4	1 9/16	1 5/16	1 1/8	7/8	11/16	7/16	0
℄ TO BOTTOM OF SKID	X	1 1/4	1 7/8	2 1/8	2 3/8	2 1/2	2 1/2	2 1/2	2 7/16	2 1/8	X	X	X	X	X	X	X	X	X
WIDTH	X	1 1/2	1 3/4	1 7/8	2	2	2	2	2	1 7/8	1 3/4	1 7/8	1 1/2	1 1/4	1	7/8	5/8	3/8	0

NOTE:
BE SURE TO READ INSTRUCTIONS.

SCALE 1/4 SIZE

R BEAUMONT

J. FERRÉ



The completed high aspect ratio soarer

SOARING CHAMP

An easily constructed plane that gives out of sight flights with no motor trouble

by **RAY BEAUMONT**

THE airplane was developed from research with gliders and owes much of its subsequent success and high efficiency to tests made with soaring planes in many countries. The true aerodynamic efficiency of a plane can be easily determined when flown without a motor, for power is often substituted for efficiency—and makes inefficiency less evident.

Model soarers provide a simple, inexpensive and interesting means of experiment and the flight time of a well designed ship is seldom inferior to power driven craft. They also eliminate the disadvantages of motor trouble, fire, breaking rubber and complication.

This model soarer is no exception and provides out of sight flights when the slightest thermal is present: it has demonstrated such ability in a thrilling manner on many occasions.

The construction is simple and similar to powered planes, and only a few hours is required to complete it. Building instructions follow.

FUSELAGE—The first step is to scale the plans to full size; all the necessary dimensions are given on the plans as well as the scales. Fuselage formers and wing ribs are given full size for convenience. When the plans are completed you are ready to begin construction by first building the two sides of the fuselage directly on top of one another so as to insure two equal sides. If you are particular, cover them with wax paper as this is a great aid in preserving them. Be sure to do all your building on a perfectly flat board to secure a perfect model.

All longerons and stringers are made of 1/8" x 1/8" balsa, also the uprights between stations 1 and 10. The uprights between stations 11 and 18 as well as all diagonals are 1/8" x 1/16".

When the sides are dry remove from the plans and separate them with a razor blade. Then wrap a piece of sandpaper around a block of wood and sand both sides of the fuselage lightly to remove all glue lumps. This will also make poorly fitted joints smooth.

Now join the two sides together starting at station 19; then join at stations 11-9-7-5-3-2, respectively. This will automatically give the fuselage proper top view shape.

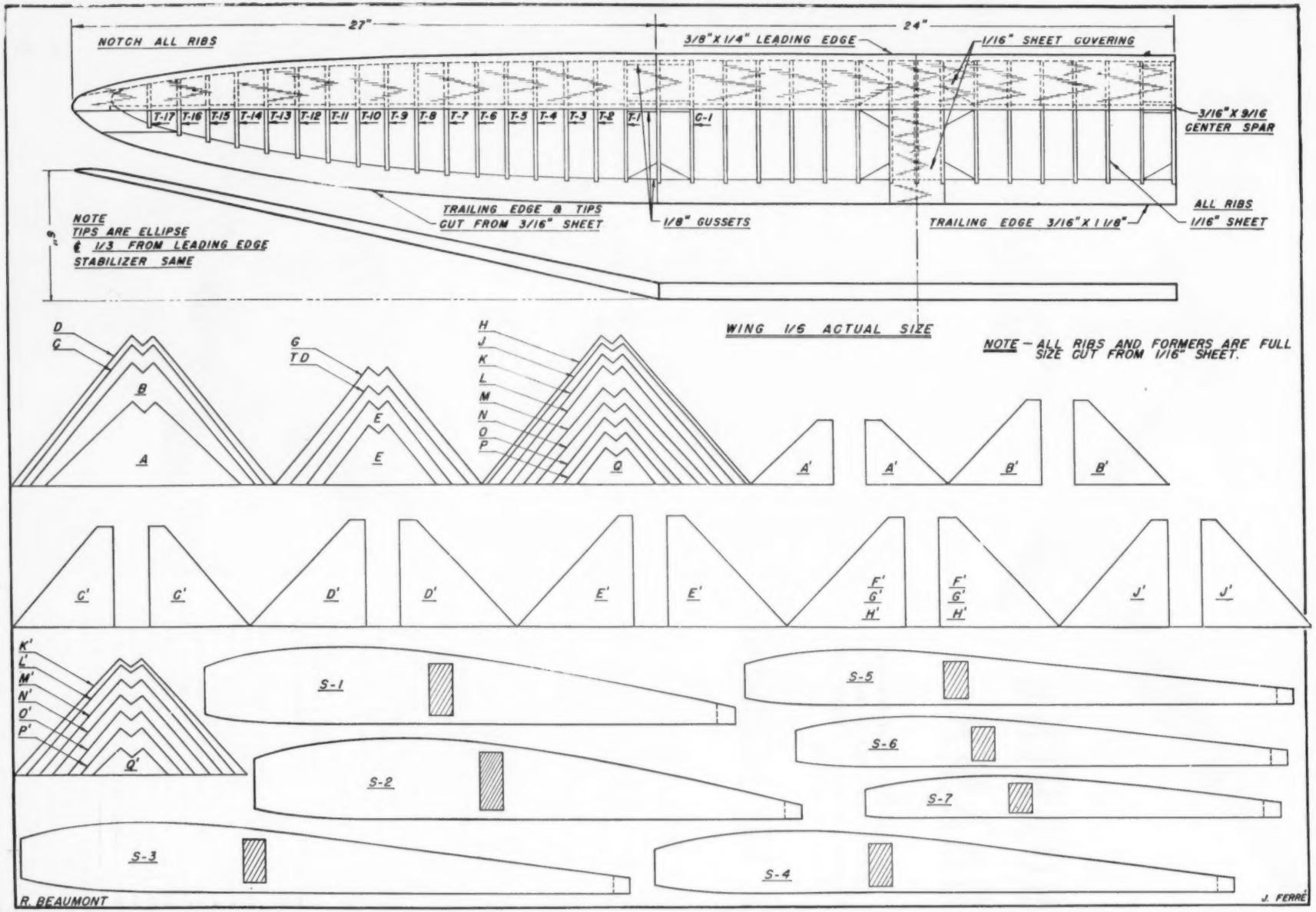
Next step is add the remainder of the cross braces. Then follow by adding the fuselage formers which are 1/16" sheet balsa. Cut the landing skid to proper shape and add to the fuselage. When this is thoroughly dry add nose block and sub-rudder, then add top and bottom stringers which are 1/8" x 1/8" balsa.

Now make the ballast box in the front of the ship between stations 2 and 3 of 1/8" sheet balsa. Add the 1/8" x 1/8" diagonals between "H" and "J" and then insert the 1/16" sheet. Follow this by sanding the fuselage thoroughly. Fuselage is now ready to apply the 1/16" sheet planking in 6 pieces; first the two sides of the formed hexagon, then the two top sides of the hexagon and then the two bottom sides. When planking has dried sand the fuselage thoroughly and add the tow-line hooks which are screwed in the skid and glued. Now insert the 3/16" dowel sticks to hold the wing in position. No further work can be done on the fuselage until the wing has been completed.

WING CONSTRUCTION — There should be no great difficulty in constructing the wing, as all wing ribs are given full size. First step is to cut the leading edge from 1/4" sheet balsa. This is 1/4" x 3/8" for the center section and 1/4" x 3/8" tapered to 1/4" x 3/16" at the tip. Now cut the center spar from 3/16" sheet. This is 3/16" x 1/2" tapered to 3/16" x 1/8" at the tips. Now cut the tips and trailing edge from 3/16" sheet, making them 3/16" x 1-1/8". Be sure to notch the trailing edge at each place a rib is to be inserted. Follow this by cutting out all wing ribs.

(Continued on page 37)

The author with his soaring champ


NOTCH ALL RIBS
27"
24"
3/8"X1/4" LEADING EDGE
1/16" SHEET COVERING
T-17 T-16 T-15 T-14 T-13 T-12 T-11 T-10 T-9 T-8 T-7 T-6 T-5 T-4 T-3 T-2 T-1
G-1
3/16"X9/16 CENTER SPAR
TRAILING EDGE & TIPS CUT FROM 3/16" SHEET
1/8" GUSSETS
TRAILING EDGE 3/16"X1 1/8"
ALL RIBS 1/16" SHEET
NOTE TIPS ARE ELLIPSE @ 1/3 FROM LEADING EDGE STABILIZER SAME
9"
WING 1/6 ACTUAL SIZE
NOTE - ALL RIBS AND FORMERS ARE FULL SIZE CUT FROM 1/16" SHEET.
D C B A
G TD E E
H J K L M N O P Q A'
A' B'
B'
C' C' D' D' E' E' F' G' H' F' G' H' J' J'
K' L' M' N' O' P' Q'
S-1
S-2
S-3
S-4
S-5
S-6
S-7
R. BEAUMONT
J. FERRÉ

T-1
T-2
T-3
T-4
T-5
T-6
T-7
T-8
T-9
T-10
T-11
T-12
T-13
T-14
T-15
T-16
T-17
C-1
S-8
NOTE - ALL RIBS ARE 1/16" SHEET BALSA
17 C-1 RIBS REQUIRED
2 RIBS EACH FROM T-1 — T-17
STABILIZER RIBS 1/16" SHEET
2 OF EACH REQUIRED
SCALE — FULL SIZE

AIR WAYS

News of model plane experimenters from all parts of the world

1. Pioneer gas model builder Joe Kovel with his super KG

2. This modeler launches his soarer with fishpole and line

3. Mario Stanislao with Sidney November's contest sweeping model

IF ANYONE should ask, "What is the factor that has contributed most to the power of our armed forces?", an accurate but surprising answer would be "Model Airplanes." To many people in high places this would appear ridiculous but this is merely because they have been visualizing an objective and not the processes that have taken place during past years which have made the objective possible.

They take for granted the intimate knowledge of aviation possessed by young men active in our war effort; men who are piloting our bombers and pursuits, manning the guns of our Flying Fortresses, young engineers guiding our planes, factory workers in machine shops and in the assembly departments.

Where have these men come from and what knowledge have they brought with them to serve Uncle Sam? Where have they received this knowledge that has given them the "edge" over the enemy in all phases of combat and production?

The seed was sown when at some tender age these young Americans built their first model plane. Their successive steps of study, design and construction, resulting in knowledge of the important factors in aviation that became a vital part of their nature. These young men think in terms of aerodynamics and spurred by the American initiative bred in Democracy, expression of their ingenuity knew no bounds. Creation of these miniature fliers was merely a preamble to the application of the principles to large scale craft; a training for combat and production that they required years to consummate and which would have been impossible to attain in the few months time in which America was required to build a war machine.

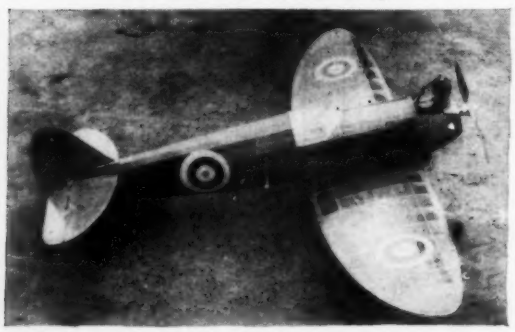
Yes, it is fortunate that young America learned to build model planes before the war descended upon us. Many of these model experimenters and engineers are contributing notably to the war effort.

One outstanding young man, a pioneer in gas model building and flying and one of the finest craftsmen in the country today, is Joe Kovel of 764 Rockaway Avenue, Brooklyn, N.Y. At present Joe is a sub-foreman in the metal department at Brewster Aircraft Company and besides his regular work has been busy instructing new men in the plant. Joe is quiet, unassuming, a deep thinker, and possesses that thoroughness born of long intimacy with craftsmanship in models. When Joe tackles a problem you know before he starts that he will conclude it successfully; he never overlooks anything and carries on his work with precision and care, a procedure resulting from thorough knowledge of and respect for the science involved.

Though Joe is a busy man he occasionally finds a few odd moments to try out his ever-increasing skill on models. In picture 1 he is shown with one of his latest planes. Oldtimers will remember that Joe built the original KG; this was an angular and awkward looking craft but unsurpassed in flying qualities. It was not built like a model but included

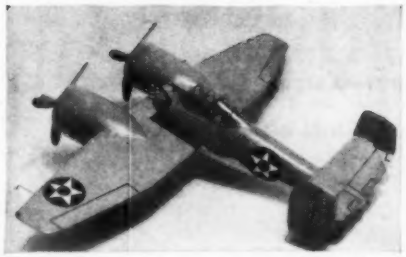
(Continued on page 46)

4. Van Sant's scale U-control Spitfire

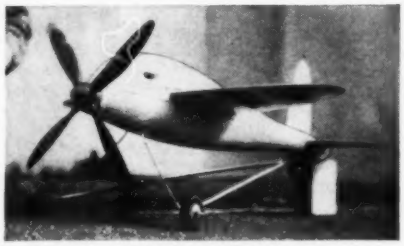


5. The Spitfire takes off

6. A landing in the snow



7. Grumman interceptor by Ray Crupi

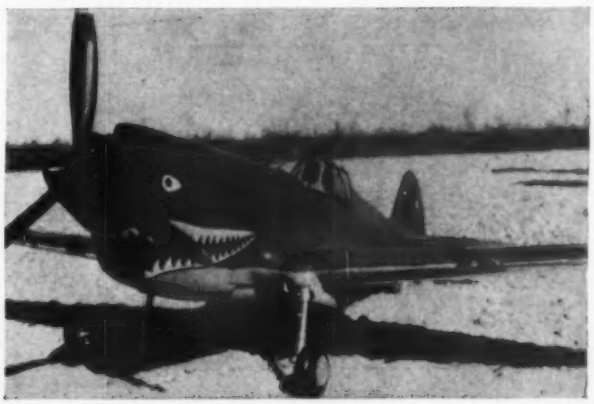


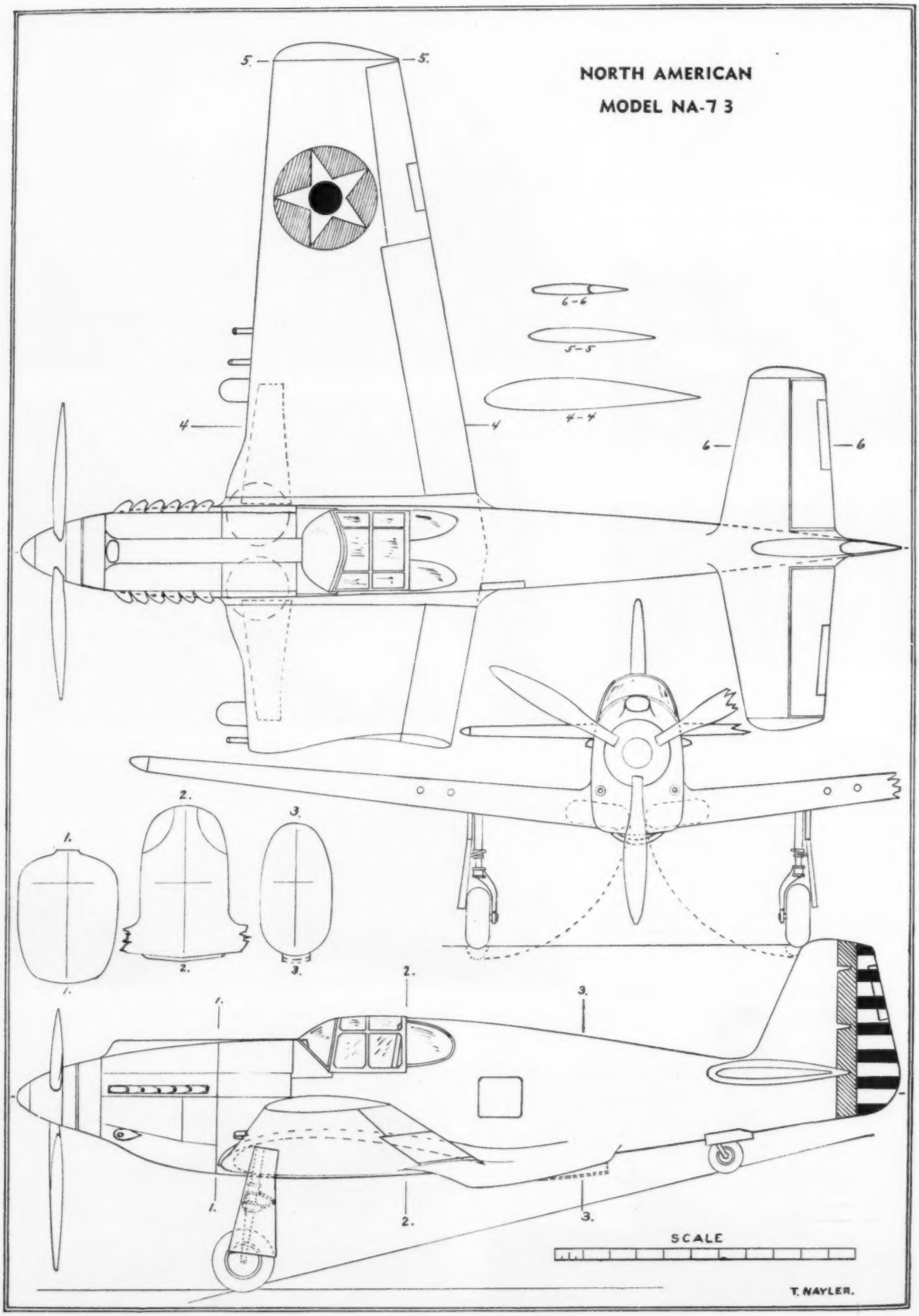
8. A carefully designed speedster

9. Barker's sleek gas job

Captions for four photos at right, top to bottom: 11. This U-control winged gas motor really flies; built by Joe Capo. 12. Mrs. Betty Geisen is highly pleased with the performance of her new tail dethermalizer shown here. The stabilizer is released at rear so it swings up, thus stalling the wing. 13. An exact scale model of a Curtiss P-40 Tomahawk, built by Kenneth Nordling, that could be confused easily for a large plane. 14. Front view of Nordling's P-40 showing machine guns in wing, intricate landing gear detail and other remarkable features.

10. Joe Scuto with his Brewster fighter



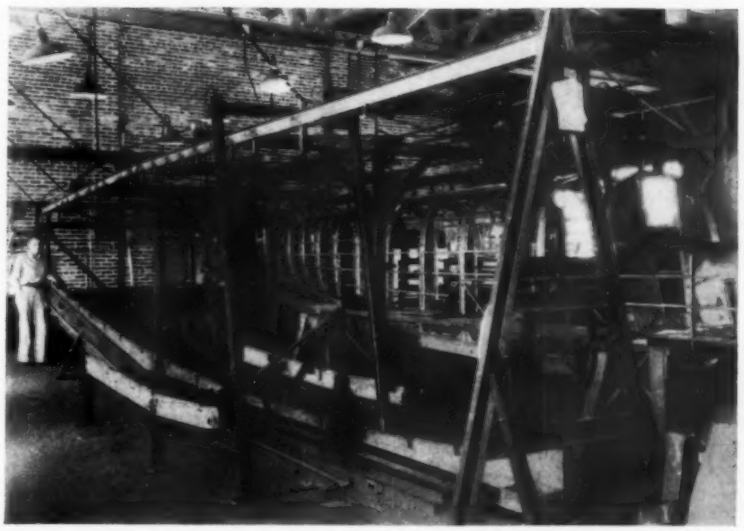

NORTH AMERICAN
MODEL NA-7 3
5.
5.
6-6
5-5
4-4
4
4
6
6
1.
2.
3.
SCALE
T. NAYLER.

STRESSING YOUR GAS JOB

The first article of a series showing how to determine stress in model plane structures and use of proper materials for light weight and strength.

by LT. J. P. EAMES *and* W. L. NYE

With the necessity of using hard wood in place of balsa wood, model builders are faced with the problem of designing model structures more carefully in order to obtain the required strength with light weight. Material must be used only where stresses require it. This series of articles gives the knowledge of stresses and materials so important for high performance with hard wood structures.



Lockheed "12" fuselage frame being assembled in a jig

WE WATCH a miniature airplane, meticulous in detail, climb steeply under the impetus of its two cycle engine of one-quarter horsepower. The stacatto bark of the midget engine continues as the little craft maneuvers and then recedes swiftly from view. Here we see a marvel of aeronautical engineering, although some model builders consider it only from a sportsman's viewpoint. But indeed, model airplane engineering is much more than a sport. In fact military authorities have made extensive use of miniature airplanes, directed by radio transmission, an agency of national defense in conjunction with anti-aircraft artillery fire. The model airplane from now on is no longer a backyard hobby but a very precise problem, involving aerodynamics and strength of materials.

Several eminent aeronautical engineers have propounded the thought that more engineering is actually involved in building a gasoline motored miniature airplane than in the full-scale airplanes which represent their prototypes, in a proportional sense. The reasoning underlying this rather startling assertion will be clarified if we consider it briefly. The manufacturer of large, full-scale airplanes is in a position to allow definite provision for losses of equipment chargeable to research and experimentation. Mathematical computations can be corroborated by means of static testing to destruction, one model of the airplane being constructed for this basic purpose. The model builder, on the other hand, is working with limited funds and time and cannot afford to conduct research in this expensive manner. In fact, should destruction of the completed handiwork occur because of improper design or construction, the modeler must stand a complete loss of financial investment, and what is more, the time devoted to the project. In other words, in model airplane engineering there is no room for a "butch," to borrow a common term of the vernacular of the industry, or to write a project slip or "E.O." (engineering order), because the airplane must be correctly engineered in all respects before it is permitted to leave the ground under its own power.

But why this emphasis on stress analysis for models? The answer is simple. Day by day, the model engineer, like the full-scale counterpart efforts in the industry, is expecting greater performance from the airplane. When the desired degree of strength can be incorporated into the model without a commensurate increase in the total anticipated weight, and yet meet a certain performance, the ideal conditions come near to being realized. This can be done through the medium of simple stress analysis. In short, we apply the theory of strength of materials to model airplane engineering. The application of a limited amount of simplified mathematical computations will allow the model aircraft builder to fabricate the structural members of the craft so that a high strength to weight ratio is possible. Do not let the added engineering in your first plane discourage you, because it will save many hours of repair later.

Entrants in trophy contests should be particularly interested in making a stress analysis of the major parts of the structure of their entries. In this field of endeavor, every ounce that can be discarded without undue sacrifice of strength will count toward the attainment of high performance. When a gas model of ten foot wing span is considered, we are dealing with a structure which is one third the span of a light plane. From this we can see and more readily appreciate the fact that we have a real engineering problem to solve, and which for best results must be treated as such.

Let's begin our treatment of the stress problem by testing the magnitude of one of the forces encountered in the course of normal flight of a typical gasoline-powered model airplane. This operation will serve as well to demonstrate the simplicity of the elementary problems involved. Suppose we are concerned with a model to be propelled by a one-quarter horsepower gasoline engine, the crankshaft of which revolves at the maximum rate of 2,000 revolutions per minute. We wish, then, to determine the torque which is defined as the turning, or twisting effort, exerted by the revolving crankshaft. The formula for the determination of torque is:

$$T = 63{,}000 \times \frac{P}{n}$$

where symbol T represents the torque in inch-pounds, P represents the full rated horsepower output of the engine, and n, represents the maximum engine revolutions per minute. Substituting for our particular case we have:

$$T = 63{,}000 \times \frac{0.25}{2000}$$
$$= 63{,}000 \times 0.000125$$
$$= 7.875 \text{ pounds.}$$

We can call this approximately eight pounds.

Now, should our engine mount be designed to withstand, as it is required to

(Continued on page 46)

AVIATION ADVISORY BOARD

Answers to questions from airminded readers

A GREAT surge of interest in aviation among many young model builders has been caused by the war in the air, indicated by many questions which come to us. This is an encouraging sign, because the war has definitely demonstrated that young pilots, gunners, mechanics, etc., are infinitely superior and learn more quickly if they have had a pre-flight training with models. So, it seems that the war is bringing the realization of the importance of model building and experiment to the minds of many educators. Consequently questions which readers send are answered by us with a deep feeling of responsibility in guiding the future air destiny of the country.

John Mahoney of 635 Anderson Avenue, Cliffside, N.J., has a number of questions which apparently are puzzling to him. He asks:

Question: Can you tell me what is the aspect ratio of my model when the chord at the tip is 3" and at the root 2"?

Answer: If the wing has a straight taper; that is, leading and trailing edges are both straight from the 3" chord to the 2" tip, then the average chord will be 3 plus 2 divided by 2. Therefore the average chord equals 2-1/2". The aspect ratio is the span of the wing divided by this average chord. The span is 15"; the aspect ratio is 6.

It is quite simple to find the average chord of any wing: Mark off equal distances from wing center to span. Then measure the chord at each one of these points. Add up all of their lengths and divide by the number of measurements taken. The result will be the average chord length. With this method the average chord of elliptical or irregularly shaped wings may be determined.

The area of the wing is found by multiplying the average chord by the wingspan, which is the distance from wing tip to tip.

Question: Where can I get a list of wing sections?

Answer: A list of sections with complete data for all types of performance is given in the book, "Model Airplane Design & Theory of Flight."

Question: How can I find the thrust line and adjust it?

Answer: The thrust line is the axis of the propeller shaft. This is stationary on gas models; on rubber models it is the axis of the shaft when the motor is wound. In the latter case it is the line passing through the propeller bearing from the center of the rear motor hook, unless the propeller bearing is of the two-point, suspension or rigid type. In this case it is the line of the propeller shaft extended.

It may be adjusted by turning the propeller bearing in any direction. In gas models it is adjusted by tilting the motor up, down or to the side.

John Fletcher of 3 Hilholme Road, Toronto, Ont., Canada wants to know:

Question: What is the center of resistance? How is it located? What would be the result if it was placed (a) too high (b) too low (c) too far back (d) too far forward?

Answer: The center of resistance is that point at which the resultant of all the small individual resistances act. It is very difficult to locate except by the most complicated calculations and tests, including wind tunnel experiments.

Usually the wing on a model causes about half the total resistance, the fuselage, tail and landing gear the other half. The center of wing resistance is on a middle of the line joining the two points at the wing chord 40% out from the center toward each tip. The center of resistance of fuselage, landing gear, etc., where two wheels are used, is located at a point approximately 2/3 of the total body depth downward from the top of the fuselage. The center of airplane resistance on this basis is halfway between the latter point and the wing center of resistance.

The center of resistance cannot be said to be "too high or too low" for its position varies with different types of airplanes, all of which may be made to fly satisfactorily. If it is very high other forces must be adjusted to balance it when in this position; for instance, when high, greater stabilizer angle must be given to lift the tail, thereby preventing it from being depressed at the high resistance. If the center of resistance is low the stabilizer must be set at a more negative angle to balance the nosing over effect of the low resistance. The resistance cannot be too far back for stability, for the further back it is the greater the stability of the airplane. If it is too far forward the plane will spin readily and greater fin and stabilizer area must be used to overcome the disturbing effect.

Question: What is the line of resistance?

Answer: The line of resistance is the line parallel with the relative wind or direction of airflow against the airplane passing through the center of resistance. Placing it high or low has the same effect as placing the center of resistance high or low.

Question: Does a very long tail moment arm tend to increase or decrease performance? How?

Answer: It may increase or decrease per-

(Continued on page 63)

AIR YOUTH

(A Division of the National Aeronautic Association)

Official Model Airplane News prepared by R. W. Nichols

Academy Contest Board Recognizes Seven New National Records

BEFORE more than 2,000 spectators at the gas model meet held on September 20, sponsored by the Holyoke (Mass.) Gas Model Club, Paul B. MacCready, Jr., broke the autogiro record with an original rubber-powered model which stayed in the air 49 seconds, exceeding the previous national record by 10 seconds. In the same meet, which began in a downpour and ended in a strong wind which caused several crack-ups, MacCready set another new record with a flight of 9.2 seconds in the Senior Ornithopter category, bettering his own national record of :03.0.

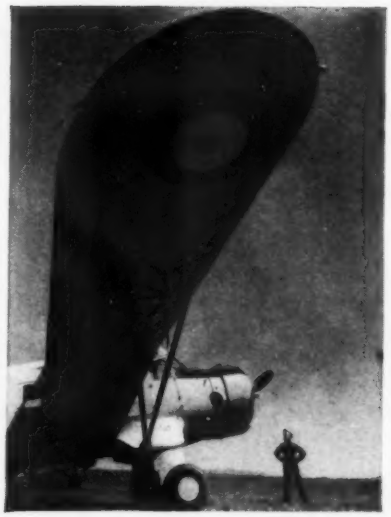
The A.M.A. Contest Board officially recognized the record performance of 6 minutes, 39.2 seconds of a Class C outdoor hand-launched stick model flown by Richard Meyer, 15, a member of the Chicago Aeronuts, on September 13. The flight was made in the Chicago Model Airport, the site of the 1940 and 1941 National Meets, during a sanctioned record trial conducted by the Chicago Aeronuts.

Applications for two national records were filed with the A.M.A. Contest Board by Frank M. Krysiak, A.M.A. Contest Director of the Fourth Annual New Jersey State Model Airplane Championship Meet held at Linden, N. J., on July 12. Mr. Krysiak made application on behalf of Walter E. Merrill, 15, who turned in a flight of 1:13.6 with a Class C outdoor hand-launched glider and for 16-year-old Richard Miannay of Elizabeth, N. J., who set a new record for Senior Outdoor Class C hand-launched glider with his flight timing of 1 minute and 30 seconds. This record was previously held by Stewart Bennett of Oakland, Calif.

Despite a fairly heavy rain the previous evening, Robert Kaufman of Barberton, Ohio, turned in a record flight on September 14 at the Akron Beacon Journal Air Cadets of America Contest in Akron, Ohio. His timing of 16:15.4 in the Class C Senior Outdoor Fuselage Model R.O.G. category upset the previous record 6:35.4. One of the Academy's most conscientious builders, Kaufman started building models at the age of 15, and stated that his record-breaking model embodies his achievement of the two principles necessary for any good contest model: ease of construction and steady performance.

In the same contest, directed by Miss

(Continued on page 42)



CANADA'S JUNIOR AIR FORCE

How Canada is preparing its youth for the air age

by **JOHN L. SCHERER**
Flight Officer RAFC

IF UNCLE SAM offered you an opportunity to join an organization where you would wear a uniform just like that worn by men of the U.S. Air Forces and were provided with first-class instruction in model flying, airplane engines, aircraft recognition, maps, aerial photography and other interesting aviation subjects, would you "join up?"

Well, that is what the Canadian Government is doing for airminded boys throughout the Dominion by sponsoring the Air Cadets of Canada, and thousands of eager lads, 12 to 18 years of age, are showing their appreciation by flocking to join the numerous units already established from coast to coast.

The Air Cadets of Canada is actually a junior air force and enables young Canadians to secure training and instruction similar to the elementary training of the Royal Canadian Air Force. The training prepares them for a time when they might desire to follow a career in civil aviation. It also creates a body of trained and disciplined young men capable of being of service to their King and country should they want to join the Royal Canadian Air Force upon attaining age; however, membership in the Air Cadets does *not* mean that they must join the RCAF when they have completed training.

The Air Cadets of Canada was started officially late in the Spring of 1941, with Canada's Governor-General, the Earl of Athlone, as patron. Air Marshal "Billy" Bishop, famous World War ace who shot down 72 German planes, was made honorary president. George B. Foster, another World War flier, is president.

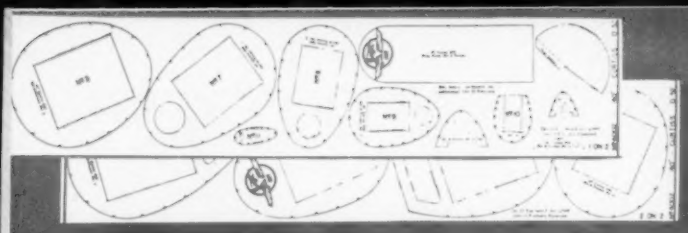
The Air Cadets is divided into two classes—Senior (boys 15 to 18) and Junior (12 to 15). They wear a uniform identical to that of the Royal Canadian Air Force and are organized into units of at least 25 boys, which are known as *flights*. A unit having 100 or more boys is known as a *squadron*. To keep the various units advised of each other's activities, the Cadets have their own monthly magazine which, in addition to news about the Cadets, features illustrated articles on aviation subjects written by officers of the Royal Air Force and Royal Canadian Air Force.

When a unit is formed, all Air Cadets begin their training as Air Cadets, 2nd Class. They remain at this rank until they have completed half of the Basic Training Course required and are then eligible for re-classification as Air Cadets, 1st Class.

Air Cadets attend weekly "drills" outside of school hours to the extent of four hours per week, part which is devoted to military drill, but most is given to classroom lectures. Sometimes special lectures are given at a nearby RCAF air station so the Cadets can become familiar with military aircraft, al-

(Continued on page 37)

Top left **The "flying classroom", used for training cadet wireless operators.** *Top right* **Jean de Brebeuf Squadron parade after inspection.** *Right above* **Cadet Jobin receives instruction from Flying Officer J. E. Jennings in the "flying classroom".** *Center* **Andre Jobin and Pierre Lebeau examine a captured Messerschmidt 109.** *Bottom* **Warrant Officer Charles Mathieu gives Cadets some technical pointers.**



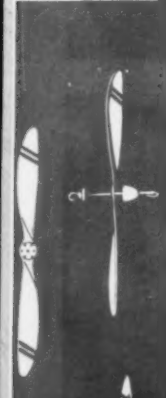
★ Ott-O-Formers are Ready-Cut in Sheets Like This ★ Remove Them in a Jiffy and They are Ready for Use ★

Ott-O-Former

Lead the Parade for 1943

Build a model plane today and choose an Ott-O-Former Kit. There's a size and a model to suit everyone. And because all the hard work is already done in the Ott-O-Former factory these kits make better planes easier and quicker. Build with Ott-O-Formers and get 'em flying quicker!

★ Nose Block Parts are Ready-Cut—Easy to Build Up ★ Propellers are Ready-Cut and Made "True-Pitch" in a Jig ★



BUILD THIS SENSATIONAL NEW TORPEDO BOMBER

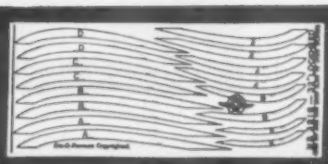
Midway's Deadly AVENGER

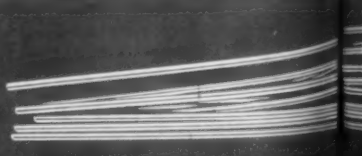
40 Inch Model
Complete Kit
$1.00
By Mail
$1.25

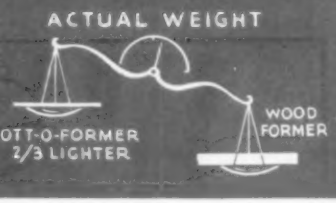
Actually Drops Torpedo While in Flight

Bomb doors, as shown in illustration, open with release of a pre-set trigger while plane is in the air and a six-inch model torpedo is fired in a most realistic way. The "Avenger" is easy to build and fly because it is a genuine Otto-O-Former Time-Saving Model.

★ Wing Ribs are Ready-Cut—Save Hours of Time ★ Extra Long Straight, Smooth Strips—







★ Slip Ott-O-Formers Over Foundation Frame for a Tight Strong Job ★ Ott-O-Formers are Lighter, Stronger

MODEL AIRPLANE KITS AND MODEL BUILDERS MATERIALS

et Them at Your Dealers Now!

HIRTY THRILLING KITS PRICED FROM 15 CENTS TO $1.39

All With Famous Ott-O-Former Time-Saving Construction

ubonita
22 Inch Wing Span Kit..... 15c

acobra
32 Inch Wing Span Kit..... 50c

urster Dive Bomber
38 Inch Wing Span Kit..... 75c

olidated Catalina
22 Inch Wing Span Kit..... 15c

tiss Pursuit
22 Inch Wing Span Kit..... 15c
27 Inch Wing Span Kit..... 29c
40 Inch Wing Span Kit.....$1.00

glass Dauntless
27 Inch Wing Span Kit..... 29c

Grumman
27 Inch Wing Span Kit..... 29c
32 Inch Wing Span Kit..... 50c
40 Inch Wing Span Kit.....$1.00
("Avenger," Torpedo Bomber)

Hurricane
22 Inch Wing Span Kit..... 15c

Lockheed
32 Inch Wing Span Kit..... 50c
45 Inch Wing Span Kit.....$1.39

Martin Maryland
38 Inch Wing Span Kit..... 75c

Messerschmitt
22 Inch Wing Span Kit..... 15c

Mustang
27 Inch Wing Span Kit..... 29c
40 Inch Wing Span Kit.....$1.00

North American B-25
22 Inch Wing Span Kit..... 15c

Spitfire
22 Inch Wing Span Kit..... 15c
27 Inch Wing Span Kit..... 29c
32 Inch Wing Span Kit..... 50c
45 Inch Wing Span Kit.....$1.00

Stuka Dive Bomber
22 Inch Wing Span Kit..... 15c
32 Inch Wing Span Kit..... 50c

Vought Sikorsky
22 Inch Wing Span Kit..... 15c
32 Inch Wing Span Kit..... 50c
38 Inch Wing Span Kit..... 75c
27 Inch Wing Span Kit..... 29c
("Kingfisher")

Vultee Vengeance
40 Inch Wing Span Kit.....$1.00

★

GO TO YOUR DEALER for any of these Ott-O-Former Kits and materials. If you cannot find an Ott-O-Former Dealer in your neighborhood send your order to address below. Minimum order $1.00 plus 25c extra for postage.

★

MODEL AIRPLANE CEMENT AND DOPE

est quality obtainable in big, generous jars and The same cement packed in Ott-O-Former Kits. t Jars 10c.

DOPES

ed / hite	Orange Blue	Green Clear	Black Banana Liquid (Tissue Cement)

CEMENT	5 Inch Tube	4 Inch Tube
	10c	**5c**

GET AN IDENTOPLANE KIT

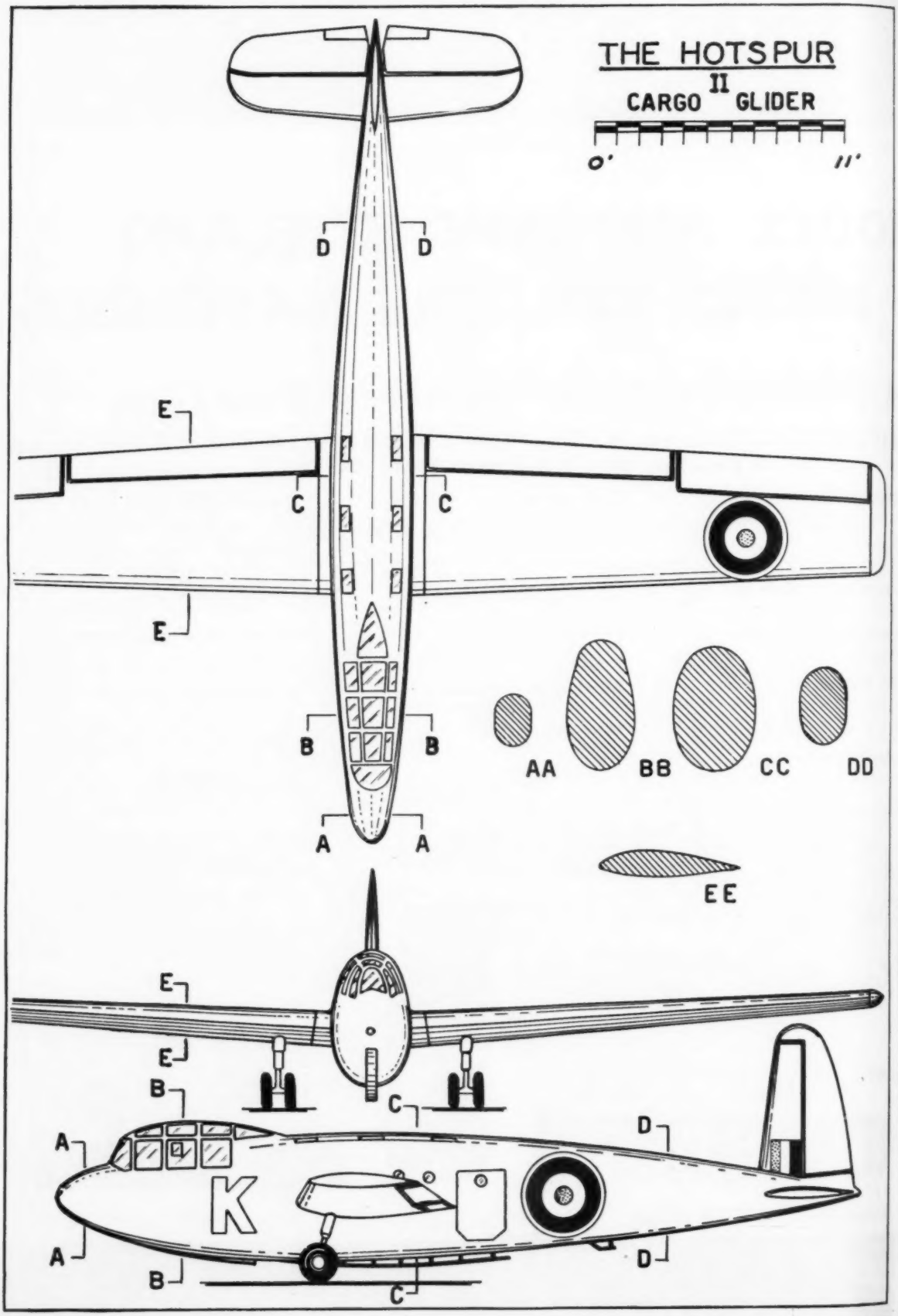
Contains material for making 24 silhouette models of American, British, Russian, German and Japanese War Planes for identification purposes. Reduced from Navy's authentic drawings..... **59c**

Same as above with 10 silhouette models **25c**

l Basswood ★

Joe Ott MANUFACTURING CO.

415 W. SUPERIOR ST. CHICAGO, ILL.


THE HOTSPUR II
CARGO GLIDER
0'
11'
D
D
E
C
C
E
B
B
A
A
AA
BB
CC
DD
EE
E
E
B
C
D
A
K
A
B
D
C

SKY SCOUTS

Learn to spot enemy planes and help defend America

Silhouette Review

ONE year ago Sky Scouts was organized by MODEL AIRPLANE NEWS to help train the youth of our nation in spotting airplanes.

Each month during the past year silhouettes of enemy aircraft were presented in order to give practice in spotting to all who joined the organization. A complete description of the various planes accompanied the silhouettes.

Anyone could join; naturally there were some qualifications. To qualify as a Sky Scout the names of each ship in 2 sets of silhouettes had to be sent in to Sky Scout headquarters; MODEL AIRPLANE NEWS, 551 Fifth Avenue, New York City; whereupon a silver Sky Scout pin was sent to the qualifying members. To become an Expert Sky Scout names of 12 sets of planes had to be submitted. Those who submitted all 12 sets qualified as Expert Sky Scouts and will receive a gold Sky Scout pin.

Many have enrolled during the twelve months; some several months after the first silhouettes appeared. Consequently they have not been able to send in answers to silhouettes they have missed. However, now that all 12 sets have been printed we are presenting a resume of these, 4 sets each month, so that if any silhouettes have been missed by members they will have a chance to send in the names of each silhouette printed. The first 4 sets were printed in February 1943 issue. Due to metal priorities, however, latecomers will not receive the gold pin.

Names and descriptions accompany the silhouettes so as to help members concentrate on the characteristics of the silhouette. Naturally in order to pick out the right name the silhouettes should be examined. This serves as practice.

So, all Scouts who have not sent in the 12 sets of answers—get busy—and as they are reprinted look them over and send us the names. In this issue the second installment of 4 sets with descriptions are given.

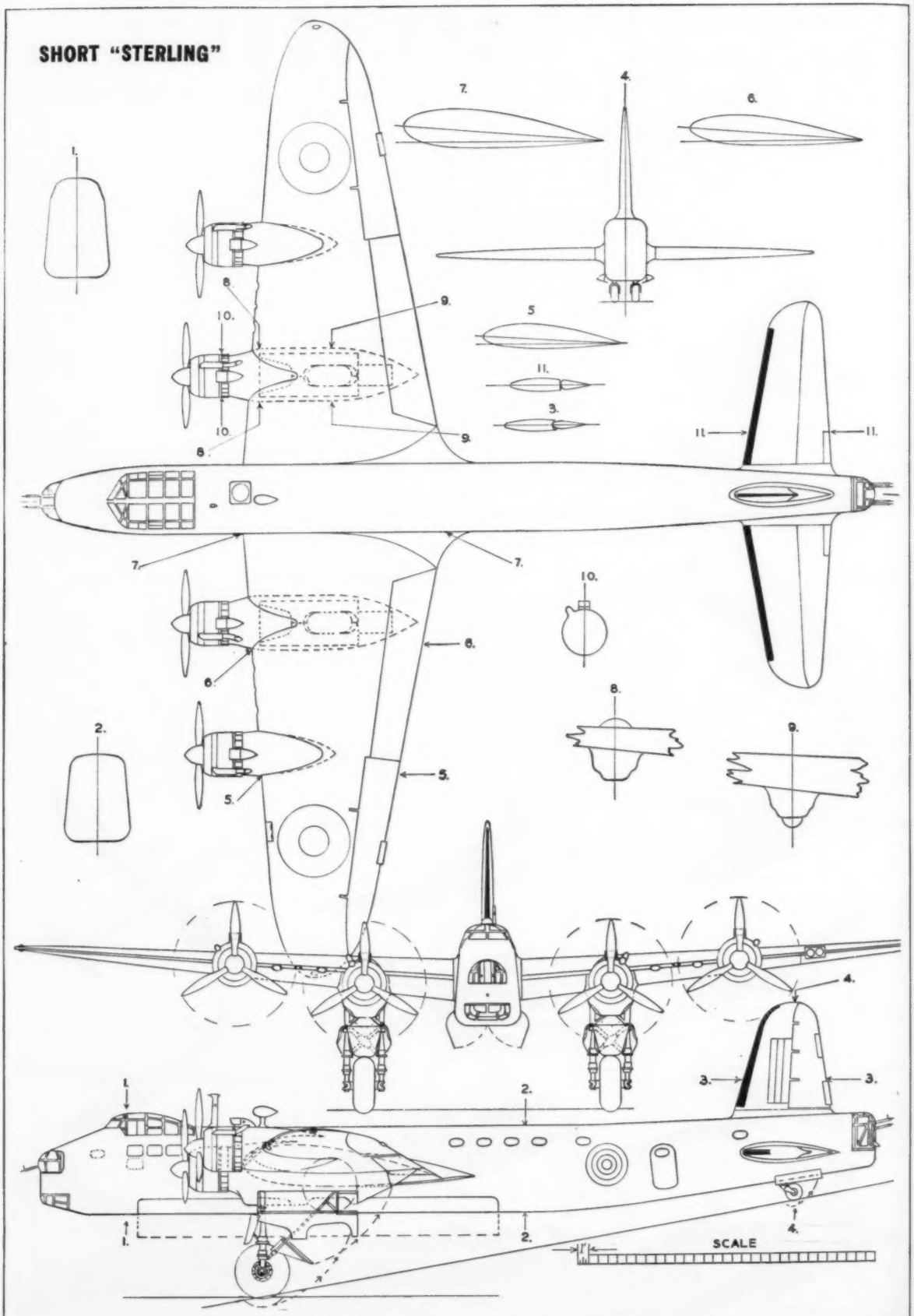
If you have formed units and hold meetings it will be helpful if you clip out the silhouettes or make copies of them and paste them on your bulletin board. In this way silhouettes of enemy ships will be constantly before you and it will not be long before you will become familiar with all their characteristics.

Description of Silhouettes—Sets 5, 6, 7 and 8

PLANE 5A—The Nakajima 94, two seat light bomber powered by a 550 hp. Nakajima 111 motor, has a span of 36 ft. 7 in., length 24 ft. 5 in. Fully loaded it weighs 5,720 lbs.; capable of attaining a speed of some 200 m.p.h. (Early models were slower, 186 m.p.h.) Protective armament appears to be one flexible gun mounted in the aft cockpit, but additional guns are probably located under the hood of the forward cockpit. The plane follows the general lines of early Voughts in almost every respect except the undercarriage, whose distinguishing feature is its antiquated cross bar.

PLANE 5B—The Hiro 97, long range flying-boat, is operated by the Nipponese Imperial Naval Air Service as a patrol bomber and troop transport. One of the largest airplanes in the Japanese service, the Hiro 97 measures 104 ft. from tip to tip; length 69 ft. 5 in. Fully loaded it weighs about 32,912 lbs. and develops a top speed of over 200 m.p.h. The ship is powered by four 720 hp. Hispano Suiza engines, which no doubt have been "redesigned" by the master imitators. As in all of their designs, when the Hiro 97 was "laid out" the Japs surveyed the field and then "borrowed" the lines of the French LeO0 H 24-6. The plane at present is the spearhead in all Nipponese overseas operations and is largely relied upon to transport

(Continued on page 62)


SHORT "STERLING"
SCALE

Soaring Champ

(Continued from page 23)

The center section requires 17-C-1 and tips require 2 ribs each from T-1 to T-17.

Now all the necessary parts are ready for assembling. The wing should be constructed on a perfectly flat board to prevent warps. When cement has dried, sand thoroughly and put 6" dihedral in each tip. Be sure to add gussets at dihedral joints. Next apply the 1/16" sheeting to the leading edge of the wing. *This sheeting proved as necessary as the paper covering after a few flights with the original model.* The extra weight did not affect the ship in any way; performance was improved. When the cement is dry, sand the wing thoroughly and cover.

STABILIZER CONSTRUCTION — The stabilizer should be made in similar manner to the wing except all tapering should be done from center of stabilizer to tips. The sizes of material are given on the plans. Be sure to add the 1/16" sheet balsa in the center of stabilizer on the bottom as shown on the plans for a gluing surface when applying stabilizer to fuselage. When completed sand and cover.

RUDDER—The rudder is simply cut from 1/16" sheet balsa, the grain running in a vertical position as shown in the plans. It should be sanded and covered with tissue.

INSERTING WING IN FUSELAGE —Lay a template of the airfoil section on the top part of the hexagon of the fuselage, with the bottom of the airfoil section resting on the top longeron, between stations 5 and 9 and then outline with a pencil. Next remove template and cut away the 1/16" sheeting outlined by the template.

Do this on both sides of the fuselage and slide the wing through the fuselage and strap in place with rubber bands. When the wing is in proper position glue the top of the wing to the fuselage. When dry cut the top of the fuselage out between formers D-TD and back along the top longerons to former H. Then cut diagonally up to top of fuselage, between the 1/8" diagonals located between formers H and J, which will make the wing look as if it slides through the fuselage when it is ready to fly.

COVERING, DOPING, ASSEMBLING—Fuselage and rudder should be covered with tissue, in order to prevent the planking from splitting. Wing and stabilizer is covered with silkspan, the grain of the paper, running in the direction of the span. Then spray the entire ship with water to shrink the paper. When dry give the ship three light coats of dope, taking special care to prevent warps.

BALANCING AND FLYING—Before gliding, balance by hand, adding air-rifle shot in the ballast box, which is in the nose of the plane, (about 1 and 1/2 boxes should be plenty, depending upon weight of the wood used). The plane should be balanced at approximately 50% of the wing chord. When you have your model balanced by hand give it a few hand glides, to see if any more ballast should be added. Now add a short length of towline to the ship until the plane is gliding properly.

The towline should be light but very strong; a lightweight fishing line is often used. Contest rules do not permit a line longer than one hundred feet.

There are two methods of making a towline: 1—Bend a hook from piano wire and attach directly to tow line; 2—75% of towline can be string and the balance rubber with the hook attached. With No. 1 the plane must be drawn completely overhead before the towline will release itself. No. 2 has the advantage that you can release the glider at any time, just by giving the towline a quick jerk which releases the hook.

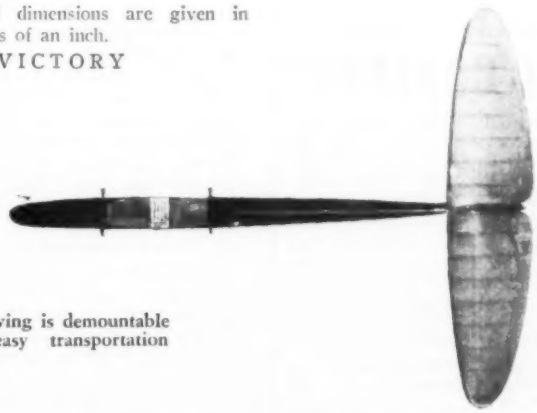
Two hooks are placed in the glider, one in front used in windy weather and a rear hook for calm weather. When adjusting your glider to circle you do not have any torque problems, so it makes little difference which way the plane circles. The rudder should be set so that the ship flies in about 100 ft. circles; flights average between three and four minutes on a hundred feet of towline without the aid of thermals. Proper care and patience will give you hours of pleasure and valuable experience, so get in the swing and "start 'em flying."

Bill of materials

10—1/8" x 1/8" x 36" balsa
2—1/16" x 1/8" x 36" balsa
2—sheets 1/8" x 3" x 36" balsa
8—sheets 1/6" x 3" x 36" balsa
4—sheets 1/6" x 2" x 36" balsa
3—sheets 3/16" x 3" x 36" balsa
2—sheets 1/4" x 3" x 36" balsa
1—nose block 1-1/2" x 1-1/2" x 2-5/8"
8—3/16" dowel
1—pint nitrate dope
4—oz. glue
2—straight hooks
2—boxes air-rifle shot
3—sheets Silkspan
2—sheets tissue

NOTE—All dimensions are given in fractional parts of an inch.

VICTORY



The wing is demountable for easy transportation

Canada's Junior Air Force

(Continued from page 31)

though they do not make flights in service aircraft. It takes about two years to complete the Basic Training Course.

On completion of the entire Basic Training Course, the "AC 1's" are again reclassified by their commanding officers and become Leading Air Cadets. These progressive rankings are similar to the advance of an RCAF recruit from Aircraftsman, 2nd Class, to Aircraftsman, 1st Class, to Leading Aircraftsman.

Leading Air Cadets who best demonstrate their ability for leadership are eligible for promotion to non-commissioned officer rank such as Air Cadet Corporal, Air Cadet Sergeant, and Air Cadet Flight Sergeant. Proficiency badges are awarded to those who have attained outstanding proficiency in one of the Specialized Training subjects which are taught after completion of the Basic Training Course.

The training given Air Cadets is thorough, instruction being handled by Air Cadet Commissioned Officers, Warrant Officers, and instructors who have seen service in the RAF, RCAF, or civilian aviation. Military drill is given by men who have seen service in the Navy, Army, or Air Force and in order to make certain that no Cadet will do work beyond his physical ability a medical examination is required before enrollment.

The Basic Training Course includes lectures on Administration, Aero Engines, Knots and Splices, First Aid, Maps, Signals, and Theory of Flight. Specially prepared handbooks help to make the subjects readily understood by even the youngest cadets. It takes about two years to complete the course—which provides a good idea of how complete it is.

While the Air Cadets have their own officers, who voluntarily give their services, RCAF officers cooperate by giving lictures, inspecting Flights and Squadrons and showing the Cadets about Air Force stations on supervised visits. Furthermore the Gov-

From the world's greatest training centre for war birds come these

10 NEW FLYING MODELS

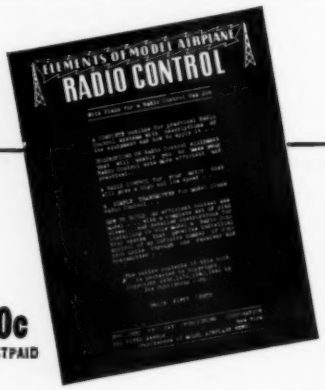
50c EACH

Each kit is complete, easy to construct and includes ration slip for purchase of rubber. Order by number

No. 401—	Noorduyn Norseman	28"
No. 402—	Westland Lysander	28"
No. 403—	Harvard Trainer	28"
No. 404—	Blackburn Skua	28"
No. 405—	Spitfire	30"
No. 406—	Baby Hornet	30"
No. 407—	Baby Moffett	32"
No. 408—	Airacobra	36"
No. 409—	Gliding Sail Plane	36"
No. 412—	Hawker Hurricane	30"

Order from your dealer or write direct, adding 5c to cover packing charges.

MODEL CRAFT HOBBIES LTD.
56 Esplanade St., Dept. 124, Toronto, Ont.



50c
POSTPAID

HERE is the latest AUTHENTIC data on Radio Flight!

"Elements of Model

RADIO CONTROL"

is an illustrated 28 page booklet that contains a complete outline for the *best* practical Radio Control systems . . . with full descriptions of equipment and how to apply it.

★ IN ADDITION to a thorough and approved course on the subject, this treatise also presents a complete set of PLAN VIEWS with detailed instructions for building an efficient gas model . . . and then equipping it for Radio Control Flight. . . Price 50c

ORDER TODAY

MODEL AIRPLANE NEWS, M33
551 Fifth Ave., N. Y.
Enclosed find ....., Please send ..... copies of "Elements of Model Airplane RADIO CONTROL," postpaid.

Name .....

Address .....

City ..... State .....

ernment has provided for a payment to units of an annual grant, similar in amount to that now paid to military cadet corps, namely, one dollar for each efficient Senior Cadet.

Each Air Cadet unit, although sponsored by the Government, represents a distinctly local effort. Local civic organizations provide the committees which are responsible for the financing and administration of the unit under guidance from Air Cadet headquarters in Ottawa. The method of financing is left to the local committees.

The initial cost of uniforming a Cadet is about $15. This money is raised wholly or partly by subscription from the Cadet; in many cases individuals or commercial firms contribute to a fund with which to buy uniforms for local boys. Specially arranged social affairs also help to raise necessary funds.

The Air Cadet program is based on a similar one in Great Britain—the Air Defense Cadet Corps which has attracted over 500,000 boys. Appealing, as it does, to the modern youth's interest in the fascinating science of aeronautics, the Air Cadet program is bound to be a success. Who can foretell to what heights a similar program would soar if organized in the United States, with its vast youth population?

Note: Further information about the Air Cadets can be secured from the Air Cadets of Canada, 122 Wellington St., Ottawa, Canada.

VICTORY

Frontiers

(Continued from page 17)

voys. These have been successfully overcome by using scouting planes and bombers to locate and eliminate the undersea craft. The 3rd picture from the top of page 18 shows a protecting fleet of Vought seaplanes roaring out over an Atlantic convoy of merchant ships. A blimp also keeps watch at low altitude.

Col. R. B. Lord, Army Engineer, writing in September issue of "Popular Science" says: "Huge flying box cars built of cheap, low carbon steel, unarmed and unarmored, can dump tons of explosives on a helpless target area, provided they are protected by waves of armed bombers and escort planes to silence all resistance. These inexpensive planes can carry far heavier bombloads than bombers, fly as fast and further, and need only two-man crews." The lower picture on the left, page 18, shows an artist's conception of an attack of these ships protected with Flying Fortresses and pursuits.

The newly developed Stinson Sentinel liaison plane is shown in the 1st picture, right-hand column page 18, and is used as "the eyes" of the ground forces. It is light, highly maneuverable, carries radio equipment which enables it to contact artillery, tank corps, cavalry and infantry. It is in fact "a flying jeep" and can take off and land on highways or plowed fields. Powered with a 190 hp. horizontally opposed Lycoming engine, it takes off quickly in a steep climb. Its wingspan is 34 ft. and weighs 2100 lbs.

Gliders have been discussed at great lengths and much has been heard concerning their development and construction. The 2nd picture in the right-hand column, page 18, shows one of the Army's latest 15-place gliders, the SG-4A. They are for the purpose of carrying troops on invasion missions. When towed to a great height they can glide silently for miles and land heavily armed forces behind enemy lines unnoticed. These ships are now in quantity production.

A clever pre-flight training plane has been developed recently. The bottom picture, right column page 18, shows the little ship being towed by a car; it never leaves the ground, however it responds to the controls operated by the pilot when traveling at 25 or 30 mph. This makes it valuable as a pre-flight training because a pilot gets the "feel" of the controls as the machine responds to them on the ground.

On page 19 is a group of pictures of Russian airpower and activity. At the top is shown a Soviet air-borne detachment just previous to boarding a transport plane to carry out an operation. The ship is a converted Douglas.

New and interesting combat technique has been developed by the Russians; when out of ammunition they do not break off combat but follow the enemy plane and if possible destroy it by ramming, or, in some cases, as shown by the 2nd picture, right column, by "sawing off" a tail surface or some other vital part with the rapidly revolving prop. The pursuit plane in the picture is a Russian I-16. The most important thing is to pick the most vital part of the enemy plane for the propeller to strike. This requires great skill. In the overwhelming number of cases on record many planes have been rammed from the rear while being pursued. Strangely enough, the attacking plane seldom incurs fatal damage.

In the 3rd picture on the right, Soviet dive bombers PE-2S are shown on their way to bomb enemy objectives in the Donets Basin. Note the modern design of these ships and the unusual camouflage shown on the vertical rudder.

One of the most efficient modern Russian light bombers is shown at the bottom, right-hand column. This particular ship was operating on the Southern Front when the picture was taken.

The 1st picture in the left column shows famous Russian snub-nose pursuit planes I-16s starting out on a mission. This model is powered with a 750 hp. M-25 motor and has a speed of 300 or more mph. It is armed with two 20 millimeter cannon and four .50 caliber Maxim machine guns.

In the 2nd picture, left column, is shown a lineup of 2-place Soviet bombing planes. A bomb lying under one of the planes at the left appears to be of the rocket-activated type of which much has been heard recently. Rocket power is included in the bomb casing and operates after it leaves the plane to give the bomb greater descending speed so it will completely penetrate armor and other protective material.

In the lower picture, left-hand column, is shown a typical Russian flyingboat of the Black Sea fleet preparing for an operational flight. It is a MRJ carrying a crew of 3. It is powered with a 860 hp. motor which gives it a top speed of more than 150 mph.

VICTORY

Megow's Victory Construction

. . . featured in the Newest and Greatest Gas Model the "Jap-Slapper"

$2.00

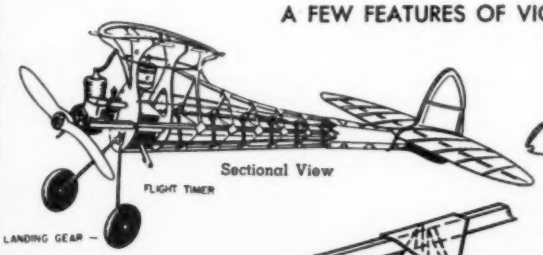
Every day new and better methods are being found. Instead of *limiting*, War Requirements are actually *causing* the production of stronger and better things. In model airplanes, Megow's VICTORY CONSTRUCTION reaches a new high in strength with all the lightness of balsawood.

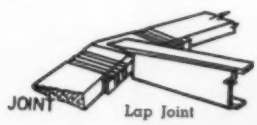
Introduced in the "Jap-Slapper," Megow's newest gas model kit, the new VICTORY CONSTRUCTION, developed exclusively by Megow, features interlocking formers and fully gusseted joints that require only the regular model builders' cement. Many ideas gained in real aircraft production appear in this latest Megow sensation. Designed especially for contest work, the "Jap-Slapper" not only meets the construction problems of the model builder, but advances every opportunity to beat the record.

The "Jap-Slapper's" wingspan is 42 inches, and overall length 32 inches. Wing area, 300 square inches with loading capacity of 9½ ounces per square foot. A class B model, for motors of .20 to .29 displacement, and a ready-to-fly weight of only 20 ounces!

If you build model airplanes, be sure you build NEW types, engineered for today's materials as found in Megow kits. If your dealer cannot supply you, order direct from us.

A FEW FEATURES OF VICTORY CONSTRUCTION





Megow

The fact that a large part of the Megow plant is now engaged in war production is not seriously curtailing the production of regular lines, and new models, meeting the demands of today both in types and in construction, are constantly coming through. Watch for them!

PHILADELPHIA, PENNSYLVANIA

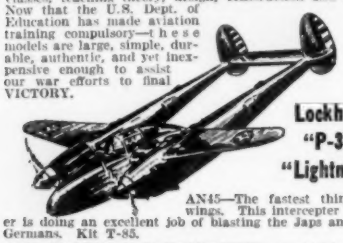
CORR'S

The Nation's Hobby Supply In The Nation's Capital

36" CLEVELAND-DESIGNED WARPLANES INDUSTRIAL TRAINING MODELS

EACH KIT only $1.50
(Plus 15c Postage)

A new educational line for pre-flight aviation training classes, teaching theory, design, construction and flight. Now that the U.S. Dept. of Education has made aviation training compulsory—these models are large, simple, durable, authentic, and yet inexpensive enough to assist our war efforts to final VICTORY.



Lockheed "P-38" "Lightning"

AN45—The fastest thing on wings. This intercepter fighter is doing an excellent job of blasting the Japs and the Germans. Kit T-85.

AN46—CURTISS P-40 "WARHAWK"—Kit-T-77
AN47—BELL P-39 "AIRACOBRA"—Kit-T-76
AN48—NORTH AMERICAN "MUSTANG"—Kit-T-91
AN49—HAWKER "HURRICANE" English—Kit-T-78
AN50—MESSERSCHMITT, "ME 109"—Kit-T-74

Get in on the ground floor—order new Industrial Training Models today—each kit, $1.50—plus 15c postage.

BUILD THIS U. S. ARMY JEEP

AN22—BUILD A JEEP. The toughest and busiest car of our mechanized army. This compact model with movable wheels and windshield makes up into a super-detailed replica. Kit includes cut-to-size parts, necessary hardware, with full-size plans and building instructions. Complete kit 60c
By mail 70c.

X-ACTO KNIVES

With Blade 50c

AN23—Sharp "as a razor" X-acto knives. Make cutting easier, faster, truer. Blades instantly changeable.

AN34—X-Acto Combination Set includes 2 knives 12 blades $3.00

AN41-X-Acto Knife Chest $3.50

SOLID MODELS

AN25—NORTH AMERICAN B-25 .....$1.00
AN26—LOCKHEED P-38, kit $1.00
AN27—SUPERMARINE "SPITFIRE" 50c
AN29—GRUMMAN "WILDCAT" FIGHTER.....50c
AN30—BELL P-39 "AIRACOBRA".....50c
AN31—MESSERSCHMITT 109-F 50c
AN40—JAP ZERO FIGHTER, 1/4" scale; easy to carve sugar maple; semi-shape fuselage. Kit....35c

CATALOG BARGAIN

AN11—6 Airplane catalogs: Cleveland, Berkeley, Hawk, Ideal and Scientific; reg. 50c value 25c
Enclose 10c postage.

AN12 — SOUCHER or Ideal Boat and Fittings, all for.....25c
Enclose 5c postage.

AN45 — NORTH AMERICAN MUSTANG $3.00
AN46—VOUGHT - SIKORSKY CORSAIR $3.50

USED MOTORS—We'll buy if priced reasonably.

AN36—MODEL AIRPLANE DESIGN—"The Theory of Flight," by Charles Hampson Grant. $3.75.

AN38 — BIGGEST $1 PLANE in U.S. Huge 7-ft. CONDOR Soarer. Kit$1.00

AN51—SINBAD the SAILER. 30" span, $1 plus 15c postage.

AN52 — INTERSTATE "CADET". National flying scale model, 33" span.....$1.50

Full stock of Champion Spark Plugs, all sizes, each 50c.

ORDER BY NUMBER
Postage Prepaid on Orders of $1.50 and more!

CORR'S

Nation's Hobby Supply for Over Half a Century

812 9th Street, N.W.
Washington, D. C.

A three wheel landing gear provides fine takeoffs and landings

An Ercoupe from Lilliput

(Continued from page 11)

plane you can't alter them at all, however you must be sure to keep the wing set at 0° and stabilizer set at 1-1/2 0° minus. The thrust line is kept at 0°-0°; that is, no down or side thrust.

With this general setup you can make almost any low-wing model fly in a very stable manner.

The construction has been kept rather simple. The us of a "crutch" in the fuselage is a great aid.

All-in-all the Ercoupe is a dandy flier, a swell looking ship, easy to build—so—what do you say if you take a crack at a low-wing scale gas model?

FUSELAGE—Make a full size drawing of the fuselage crutch. No other fuselage drawing is needed. The bulkheads are given full size. Use of balsa is naturally advised but if supplies are limited, substitutions of pine or bass may be made in most cases without too great an increase in weight. Use your own judgment as to sizes of the heavier woods.

Pin 1/8" x 1/4" strips in place on the drawing of the crutch and cement cross members in their proper locations. Basswood motor mounts 3/8" x 1/2" and now cemented in place. Space the motor mounts to fit your individual motor. Add the 1/4" sheet fill-in around the motor mounts and crutch with several coats of cement.

Cut the bulkheads top portions from 1/8" sheet balsa and cement them in proper locations. Add necessary 1/8" square stringers to the turtle back. Cement 1/16" sheet balsa to form the cockpit shape.

Build the lower portion of the fuselage by constructing the "V" shape from 1/8" x 1/4" balsa strips between bulkheads D and G. The lower portions of bulkheads D, E, F and G are now cemented against the 1/8" x 1/4" uprights. Bulkheads A, B and C are now added with H connecting A and B. The remaining fuselage stringers are now cemented in place. Cement a 1/8" sheet flooring between bulkheads B and D at the bottom of C as shown in the fuselage side view. This forms a box for the wing to slip into.

Bend the front landing gear strut from 1/16" music wire with a single 2" diameter balloon wheel to the required shape. This is now secured to the plywood bulkhead A with basswood blocks, as shown, and several coats of cement. Make sure all joints are very firm.

The cowling is shaped from balsa blocks cemented in place then carved and sanded to shape and hollowed to fit your motor. Motor is inverted so lower cowling is permanent while upper hatch is removable to allow engine adjustment.

The tail block is carved to shape from a soft balsa block to the shape shown on plate 3. Cut two light formers to the cockpit outline from 1/16" sheet and then proceed to cover the cockpit with heavy celluloid. Cement 1/8" hardwood dowels where shown to wrap the rubber strands around that hold the wing and stabilizer in place.

TAIL SURFACES—The rudders and stabilizer are very simple to make and are constructed directly over full size drawings.

The stabilizer is built in one piece. Pin the 1/4" sq. leading edge and the 1/4" sq. spar on the plans along with the 3/16" x 1/2" trailing edge. Cut the ribs from 1/8" x 1/4" balsa strips and cement in place. Note the end ribs are 1/4" sq. balsa. This is to give a firm base on which to cement the rudders. Sand the ribs to a slope to flow evenly into the trailing edge, which is also tapered.

Rudders are constructed in quite the same manner as the stabilizer. Full size rudder patterns are given on Plate 3; since there are two rudders, two of each pattern is needed. Cut these outlines from soft 1/4" sheet balsa and pin them in place on the plans. Insert the 1/8" x 1/4"

It is a consistent and amazing flier

YOU CAN'T BEAT "SCIENTIFIC" KITS FOR QUALITY!... DESIGN!... PERFORMANCE! VALUE!

YOU CAN'T BEAT "SCIENTIFIC" KITS FOR QUALITY!... DESIGN!... PERFORMANCE!... VALUE!

That's Why More and More Model Builders Every Day are Buying "SCIENTIFIC" KITS!

GAS TYPE "HITS"

They Look, Sound and Fly Just Like Real Gas Models

ONLY $1.95 EACH

Postpaid or at your dealer

FLEA

Wingspan 36" Length 28"

MISS AMERICA

Wingspan 40"
Length 27½"

FIREFLY

Wingspan 36"
Length 28"

FLAGSHIP . . . Class "C"

- Wingspan—78"
- Wing Area—850 sq. in.
- Overall Length—44½"

$5.50

POSTPAID
or at your dealer.

VARSITY Class "B"

- Wingspan—50"
- Wing Area—370 sq. in.
- Overall Length—33½"

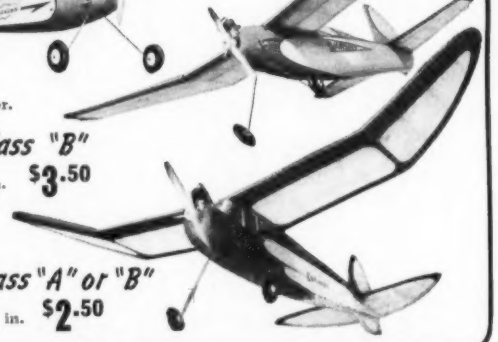
$3.50

★

CORONET Class "A" or "B"

- Wingspan 46¼"
- Wing Area—300 sq. in.
- Overall Length—30"

$2.50



30" DEFENSE SERIES..95¢ ea.

Postpaid or at your dealer.

CURTISS P-42

BREWSTER "340"

CURTISS SB2C-1
"HELLDIVER"

REPUBLIC P-47
"THUNDERBOLT"

Compare "SCIENTIFIC" with any other kits and judge for yourself!

VICTORY SQUADRON

Flying Scale Models of Planes You Read About In the Headlines

25" WINGSPAN 50¢ EACH

Postpaid or at your dealer

Bell P-39 "Airacobra"

Grumman "Wildcat"

Curtiss P-40 "Warhawk"

"GAS MODEL HEADQUARTERS"

SCIENTIFIC MODEL AIRPLANE CO.

218-220 M-3 MARKET ST.
NEWARK, N. J.

Easier!
F-A-S-T-E-R!
MORE ACCURATE
THOUSANDS OF CLEVER USERS SAY THIS OF the
X-acto
EVERKEEN KNIFE
RE-blade to RE-sharpen
Everything PLUS... that's what these revolutionary knives have! New hand-comfort — new "never-before" keenness. Eight instantly interchangeable blades make two models (Nos. 1 and 2) "custom built" for any whittling or carving job.
LET'S TAKE X-ACTO APART—SEE!
Just four parts — the solid handle, the hollow sleeve, the split collet, the world's keenest blades. SLEEVE: ¼ turn clockwise releases blade. Unscrew sleeve, slip off and see split collet, which grips blade, like lathe collets grip work.
HANDLE COLLET BLADE
Collet taper shows why only ¼ turn of sleeve loosens or tightens blade. Fast? You'll say so!
Get your X-acto today..at local hobby shop, hardware or department store or order direct!
No. 1 X-ACTO knife for light, delicate work, complete with one blade. 50c. With 5 extra assorted blades. $1.00 ●
No. 2 X-ACTO knife for heavy carving — Complete with one blade, 50c ● With 5 extra assorted blades, $1.00. ● No. 62 Double Set handles 12 blades, $2.00 ● No. 82 Fitted wooden chest 3 handles and 12 blades, $3.50.
No. 62
No. 82
GET THE FREE BOOK THAT TELLS
"HOW" to build Model Planes prepared by experts, profusely illustrated, simple easy-to-follow instructions. Build solid models for Army and Navy spotter planes. Send 5c to cover handling, postage, etc.
Buy from your local Hobby Shop, Hardware or Dept. Store or order direct.
REFILL BLADES KEENER THAN RAZORS ONLY 50c THE PACKET OF 5 ● MAKES 2 X-ACTOS DO THE WORK OF 8
X-ACTO CRESCENT PRODUCTS Co.
445 FOURTH AVE.
NEW YORK, N. Y.
X-acto EVERKEEN knife
RE-blade to RE-sharpen
No 1
No 2

spar and ribs and cement each joint firmly. Trim and sandpaper rudders to a streamlined crossection. Note the rudder rib that joins with the stabilizer is 1/4" square balsa.

WING—The wing is constructed in one piece, built over a full size drawing. Wing construction is very simple but care must be used to avoid any warps.

Cut the wing tips from 1/4" sheet balsa; full size patterns are given in Plate 3. Cut the required wing ribs.

Trim the 1/4" x 1" trailing edge to shape and pin in place. Pin the two 3/16" x 1/2" wing spars in place. Now insert wing ribs in proper locations and cement firmly. The 1/4" sq. leading edge is now cemented in place. Note that the leading edge is set on edge. Trim and cement the wing tips in place.

Install 3-1/2" dihedral under each wing tip; make sure the dihedral joint is strong. Use 1/8" sheet gussets on the spars and leading and trailing edges for extra strength.

Bend the rear landing gear struts from 1/16" steel wire and mount as shown in the diagram. Note the ends of the landing gear struts are wrapped to the wing spars with heavy thread. It is also backed up by grooved basswood block cemented between the two spars over the wire. Use lots of cement at this point. The wheels are held in place by a drop of solder at the end of the axles. A very hard piece of balsa is used as a fairing on the upper part of the landing gear strut. Cement this to the rib too.

The centersection is now covered with soft 1/16" sheet balsa to provide extra strength around the dihedral joint and landing gear stations. Trim the top and bottom of each rib 1/16" so that the wing contour is the same all along the wing.

Build up a small box-like structure at the wing joint to fair into the fuselage as shown in the sketches. Use 1/8" sheet for this work. This box fairing should fit snugly into the box formed between bulkheads B and D.

COVERING—It is advisable to use colored Silkspan for covering rather than color-doping the model. Of course color is optional. Use heavy clear dope as an adhesive. Sand the frameworks lightly to remove any flaws and ridges that might mar a neat covering job. If any warps have developed they should be removed before covering.

Cover the fuselage first, using several pieces of Silkspan to fit the curves of the turtle-back and sides. The cowling and similar wood parts, such as the landing gear struts, are tissue covered, too.

Use a separate piece of paper for top and bottom of each section of the wing and tail surfaces. Once all parts are covered lightly spray them with water to tighten the paper. Then apply two or three coats of clear dope with a brush. Cover the cabin with heavy sheet celluloid.

All items such as cowling details, insignia lines or designs, control surfaces outlines, etc., are made from colored paper. Outline the windows with strips of black paper doped to the culluloid cabin.

FLYING—After completion of the Ercoupe Sportplane check the model's surfaces for warps. The Ercoupe's tail and wing are constructed solidly enough to resist warping, but if warps do occur take them out.

The coil and battery box is located in the fuselage where it gives the best balance for flight.

Initial flights of the original Ercoupe proved its airworthiness, and by carefully making flight adjustments championship performance will result. Remember the wing must be kept at zero degrees incidence and the stabilizer is kept at 1-1/2 degrees negative incidence. Never change these settings. Shift weights to trim the ship. The thrust line has no down or side angle.

Glide the ship several times, shifting weights to obtain adjustment. Remember that careful slow adjustments save much time and effort.

Set the timer for 15 seconds for the first flight and use very low power. Under power the model should climb slowly in 200 foot circles to the right. When the motor cuts it should go into larger circles in a very slow glide. If the ship reacts well on the first flight, fly it again with the same power run. Then each next flight should have a wider open throttle until you are flying under full power.

We have presented you with a low-wing scale gas model that we claim will fly as well as any other model on the field. If you build this model we are sure it will meet with your approval, and we know that it will bring you many hours of satisfatcory flying and enjoyment.

Bill of Material

2—1/4" x 1" x 36"
4—3/16" x 1/2" x 36"
3—1/4" x 1/4" x 36"
4—1/8" x 1/4" x 36"
10—1/8" x 1/8" x 36"
4—1/16" x 2" x 36"
3—1/8" x 2" x 18"
1—1/4" x 2" x 18"
1—3/8" x 1/2" x 15" basswood
3—Sheets silkspan
Sheet celluloid
1—1/16" steel wire x 24"
Balsa cowling blocks
1—2" Dia. wheel
2—2-1/2" Dia. wheels
1—Piece 3/32" plywood
Cement
Clear dope

VICTORY

Air Youth

(Continued from page 30)

Frances Alexander, Richard Obarski set a record with his Class C Outdoor Fuselage R.O.G. model in the Open (over 21 years of age) Category before 10,000 spectators. Obarski's longest flight was timed at 9 minutes, 55 seconds.

Control Licenses Now Available From A.M.A.

Experimental control-model licenses are now available from the Academy of Model Aeronautics and are free to those now holding the regular Academy gas-model license. Both licenses will be set up to expire on

MODEL CRAFT
LOS ANGELES, CALIF.

Modelcraft

Largest Supply House in the West

JUST A FEW LEFT!!

Priorities on Scarce Materials Is Forcing Us to Discontinue These Models

If you want high quality, painstakingly engineered kits of outstanding flying models with aluminum cowls, act NOW. There's a record of winning performance behind each of these superb models, each of which has its own characteristics. Fly one this Spring and have a model that CANNOT BE BEAT in looks or performance.

MISS TINY Queen of Class A aviator-type ships. A 46 inch constant cord edition of the Pacific Ace. Miss Tiny is practically unbeatable in Class A if the flyer knows his models and uses a good engine. We have yet to hear of an owner who isn't crazy about Tiny. Don't choose her if you are looking SOLELY for contest performance (choose a Spook 48), but if you want a model that looks like a real airplane and will almost behave simply by talking to her, get a Tiny. Standard kit, non-inflat. wheels..... **$3.25**

TESTED GLIDERS

Manufactured by the FIRST house to produce a TOWLINE GLIDER. These are not new models, but have been thoroughly proven over a period of three to five years in all parts of the U. S., Canada, Mexico and other foreign countries. Designed by a former manufacturer of gliders and sailplanes.

ALBATROSS—45" Wing Spread. An EXCEPTIONAL buy at this price. **60c** 10c postage

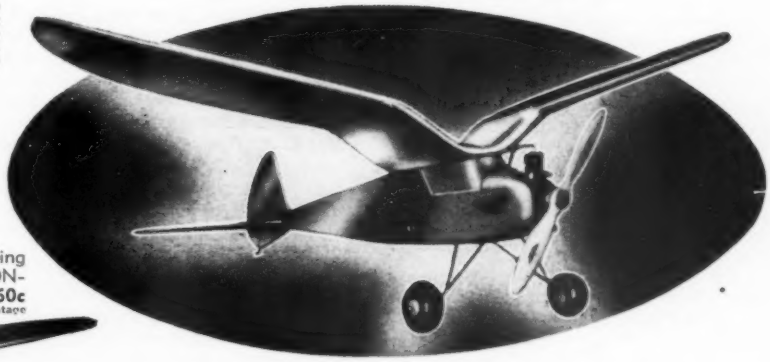
SOARING GLIDER—30" Wing Spread. Consistent flights of an hour and more. **25c** 10c postage

Latest Advanced Design and Features

Designed to eliminate stalls and spins. The *Westwind* is equipped with WING SLOTS that greatly smooth out climb and increase glide, and make the model easy to control for limited duration flights. Strong as any gas model ever built, yet you'll have to carry the best battery on the market to bring the weight up to 8 oz. per sq. ft. Streamlined and modern in appearance, a *Westwind* is the end-of-the-search for the modeler who is looking for super-stable performance. Wing span 54". Cord 8½". Tail quickly removable for convenient transportation. Has been 3 hrs. in the air without going out of sight. **$3.85**

For Class B or any small Class C motor

SPOOK 48—CLASS A OR B



The model that proved a theory of Model-craft engineers that nature's wing design could be adapted to mechanical flight. With a Spook 48 you know you have the fastest A *or* B job on the field. This little kite doesn't merely climb, it tears. Looks leave nothing to be desired. Wing is easily removable to get to the battery, and is so mounted as to fly off in the event of a rough landing. After well over 2000 flights, the test model remains undamaged..... **$2.25**

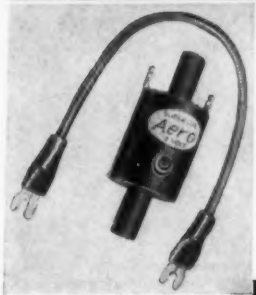
Complete Illustrated Broadside of Modelcraft War Models On Request

7306 SOUTH VERMONT AVE., LOS ANGELES, CALIFORNIA

MODELCRAFT

AMERICA'S FINEST
IGNITION EQUIPMENT

PROMPT SHIPMENT FROM STOCK



Each coil complete with High Tension Lead and Instructions how to obtain longer life from your Batteries and Ignition.

AERO FEATHERWEIGHT
America's lightest, most efficient spark coil. Standard equipment of the finest model engines, 3 volt operation. Weighs 1½ oz. $2.25

AERO SUPER
Lightning Start, Low Battery Drain, Peak Performance, Starts and Operates on Two Pen-Cells. Weighs 2¼ oz. $2.25

AERO RACER
The fastest coil in the world. Steady spark at 15,000 r.p.m. Designed specially for race cars and speed boats. 3 volt operation. Weighs 3 oz. $2.50

AERO QUALITY
Special all-purpose Coil. Operates on Pen-Cells or Batteries up to 4½ volts. Weighs 2½ oz. $2.50

HI-Tension Lead Wire 15c *Matched Metal Case Condenser* 25c
Ask your dealer to show you the complete Aero line—today.

AERO SPARK CO. Box 586 Hicksville, L. I. N. Y.

the same date. In other words, if you hold an A.M.A. license that will expire next May 30, you will be issued an experimental control-model-flier's licenses to expire on the same date. Only requirements are that you make application on the official form and enclose ten cents in stamps to cover postage and handling charges.

Gasoleers who are now flying control models may secure one of the licenses for the standard fee of $1. Both the present A.M.A. licensed flier and the non-licensed flier should make application on the official control-model-flier's license application obtainable from A.M.A. headquarters, 1025 Connecticut Avenue, N. W., Washington, D. C.

First Air Youth Training Bulletins Released

The first in a series of Air Youth Training Bulletins have just been released by the Air Youth Division of the National Aeronautic Association. These bulletins, profusely illustrated, and designed to bring all phases of aviation to the youngster from ten to sixteen years of age, have been in preparation for the past six months. Each is four pages in length; page size is 8½ by 11 inches, and they are triple punched to fit in a standard notebook cover. The first nine in the series have just been issued.

Already the Air Youth bulletins have attracted much favorable comment from aviation leaders and educators alike. One of the first school leaders to see them in final form was Mr. Mark DeGrange of Hill School in Pottstown, Penna., who requested a large supply for his students.

Although additional bulletins are expected to be issued regularly, the first nine provide much material of interest to students and of aid to teachers of aviation classes or clubs. The title and contents of the first nine Air Youth Training Bulletins are as follows:

No. 1—"Man and Flight," the story of aviation's early days, including some little-known, but very interesting, facts on aerial maps.

No. 2—"Me and the Wright Brothers," a fictionalized account of the first flight by the Wright brothers, with detailed plans and specifications for the first man-carrying plane.

No. 3—"Wings—Bird and Man," a conversational account of the comparison of man's attempts to fly and the easy, graceful flight of birds. Simple explanations of basic aerodynamic principles.

No. 4—"Types of Aircraft," a brief, but well-rounded account of various types of planes accentuated by an imaginary trip to an aircraft show.

No. 5—"Ships of the Sky," an extension of Bulletin No. 4 with explanatory sketches of different types of aircraft.

No. 6—"Model to Fighters," a comparison of model planes and latest type fighter aircraft. Hints on how to start an aviation museum and plans for the historic Santos-Dumont "Demoiselle."

No. 7—"Built for Flight," an interesting review of the different materials use in the construction of full size aircraft and model airplanes. Methods of construction illustrated for both miniature aircraft and the prototype.

No. 8—"Cousin from the Country," a story of mistaken identity in pilots, proving that fancy clothes don't necessarily make a good pilot. Plans for the famous Farman III Biplane and an engaging Air Youth aircraft nomenclature game.

No. 9—"Wings Against the Sky," suggestions on how to identify friendly and enemy planes with eighteen 3-view silhouettes of latest-type aircraft based on official drawings of the Navy's Bureau of Aeronautics.

In addition to the features listed, almost every bulletin has a section devoted to suggestions and ideas for starting junior aviation clubs, scrapbooks, or undertaking some activity related to the study of aviation by the 10 to 16 year old enthusiast.

Additional Air Youth bulletins are now being prepared. Each set of 10 will be accompanied by a unique test sheet so the instructor or individual student may check on the progress of the reader or student.

The first nine bulletins are available from headquarters. A sample set of these is available postpaid for forty-five cents.

Harold deBolt of Buffalo (N.Y.) Aernuts . . . About Control Line Flying

"Control line flying has had a late start in Buffalo, but it has caught on quickly with the result that we all have either a job or one under construction at the present time. A few of us have a good many hours of flying to our credit and as one of them I would like to say that it is a great sport and entirely different from the "free flight" jobs. However, I don't think a real model builder would want to stick to control flying altogether as there are many things about free flying that you can never get in "control line." In spite of 12 years at the game, I still like to go out and hook a good old thermal; there's something about a thermal flight that gives you the old thrills.

"Speaking of thermals, it was my misfortune to lose about seven gas models in 1941 at various meets, and as a result I installed dethermalizers in my '42 jobs and in hundreds of test flights and contest work I did not lose one! I found I could set the timer for about two minutes and give the ships full fifteen seconds on the best of days without an "off the field" flight. I have seven jobs with them now and I wouldn't take them off for love or money. I think they are worth their weight in gold, so let's leave that part of the rules the same.

"The boys up this way think that control line models are just the thing for experimenting. A fellow can "cook up" almost anything and it will fly on a line somehow. So it is our opinion that the rules should not be strict at all, perhaps just divide them into three classes according to motor displacement and let us go at it. I am sure you would see some astonishing results."

—Harold deBolt, AMA Contest Director, Buffalo (N.Y.) Aeronuts.

Willis Brown Tells of Meeting Ensign Herbert Greenberg

"In visiting the Curtiss Propeller Co. School recently, my attention was drawn to a tall red-headed Navy Ensign, it couldn't belong to any other than one certain model builder of national fame. You're right, it was Ensign Herbert Greenberg, formerly of New York City.

"Herb seemed mighty glad to see a familiar face and certainly makes a right smart-looking Naval officer. He tells me that he is based at Bannana River, Fla., where he has been flying some of the large Navy deep water boats.

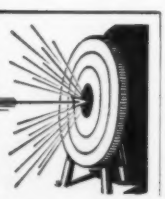
"Herb is the first of his unit to be sent to the Curtiss Propeller school to learn the intricacies of the manufacture and maintenance of the latest type electric propellers, which seems as though he was keeping up his former habits of being first in important places. Good luck, and happy landings, Herb!"

—Willis Brown

Air-Age Education

Typical of high schools throughout the

AMERICA'S FASTEST GROWING SPORT
Send 5c for Catalogue showing Targets, Hunting Bows, Arrows, Archery Sets and Accessories. Complete Sets 95c to $15.95.



Dealers Wanted
ACE MODEL PLANE CO.
3149-M Shenandoah St. Louis, Mo.

PLANE TALK **SKYWAY**

Dollars Are Doing Double Duty!!

Keep Building—Keep Flying—KEEP SAVING AT SKYWAY!!

BALSA BARGAINS SHEETS-STRIPS-BLOCKS 50c

Irregular sizes BUT EVERY PIECE USABLE! In ready-to-ship packages (about 3 lbs. weight). Enormous value in each pkge. While they last only 50c (BY MAIL: INCLUDE SUFFICIENT POSTAGE TO YOUR ZONE! MUST BE INCLUDED!)

WHY PAY MORE? The Equal of ANY 50c or $1 KNIFE!

SKYWAY All-Metal UTILITY KNIFE

Easiest-to-work-with! Safest! Equally efficient on delicate or heavy-duty projects! Refills in a jiffy! Knife with double edge blade 10c (By mail: 15c). Extra blades 2 for 10c; Knife with blade plus 2 extra blades 25c, postpaid.

18" Balsa Strips Select, hard stock

1/16 sq. ...15, 5c
1/16x⅛ 16 for 5c
1/16x3/16 8 5c
1/16x¼ 5 for 5c
3/32 sq. 10, 5c
⅛ sq. 10 for 5c
⅛x3/16 7 for 5c
⅛x¼ 6 for 5c
3/16 sq. 5 for 5c
¼ sq. 4 for 5c
¼x½ 2 for 5c

18" Balsa Sheets

1/64x1½ 5for 10c
1/32x½ 6 for 10c
1/16x1½ 5 for 10c
3/32x1½ 4 for 10c
⅛x1½ 4 for 10c
3/16x1½ 3 for 10c
¼x1½ 2 for 12c
½x1½ ea. 6c
5" & 36" cost twice 18"; 3x36, 4 times.

NOSE BLOCKS

1x2x1 ...1c
2x2x1 ...2c
2x2½x1 ...3c
3x3x1 ...4c
3x3x2 ...8c
3x3x3 ...10c
5x5x2 ...17c

5 FOOT BALSA (Minimum $1.00)

⅛x¼ ...6 25c
⅛x3/16 ...5 25c
⅛x¼ ...4 25c
3/16 sq. ...4 25c
¼ sq. ...3 25c
¼x½ ...2 25c
⅜ sq. ...ea. 15c
½ sq. ...ea. 20c
Sheets, 4 times 18".

18" Balsa Planks

½x½ ...10c
1x1 ...10c
1x2 ...20c
2x2 ...30c
2x3 ...50c
2x6 ...95c
3x6 ...1.50

PROP. BLOCKS

½x 3¼x5 4 for 5c
½x 3¼x6 3 for 5c
⅝x 1x8 2 for 5c
3¼x1¼x10 ea. 3c
8¼x1¼x12 ea. 4c
1x1½x12 ea. 6c
1x1½x15 ea. 9c

Plywood—1/16

⅛,3/16,¼ 40c ft.

AVIATORS TRAINING COCKPIT

COMPLETE PRE-FLIGHT TRAINING COURSE. Complete kit contains full size instrument panel with movable dials, full size 'joy' stick for control manipulation; 30 pages, illustrated instruction book and instructions for plane identification. $1.00

CAMOUFLAGE KITS

7 bottles varied camouflage colors with instruction booklet. $1

NOTE: Marvelous for training cockpit or camouflage. Kit must be accompanied by postage to zone of delivery.

ALLOWANCE For old motors toward purchase of other merchandise.

CEMENT
CLEAR DOPE
THINNER
Banana Oil
1 oz. 6c, ½ pt. 40c
2 oz. 11c, pint 60c
Colored Dope
1 oz. 8c, 2oz. 15c
½ pt. 50c, pt. 75c
MICROFILM
RUBBER LUBE
WOOD FILLER
LIQ. CELLULOID
1 oz. 9c 2 oz. 15c
½ pt. 50c, pt. 75c

G. M. SILKSPAN
white, 3 for 25c.
Rubber Power, per sheet ...5c

AA TISSUE
All col., doz....35c
silver, ea. ...5c
Superslik, wh. 5c

Bamboo Paper
White 6c, 5 for 25c
Colors, 2 for 15c

Plastic Balsa
4oz. 29c; tube 10c

Trexler Wheels
1¼, 1½—45c
1¾, 2—55c
2¼, 2½—66c
Gas Mod. 2¾-1.10
3-1.40—3¼-1.65
4¼-1.95

M&M WHEELS
1¼, 1⅜, 1⅝ 60c
1¾, 2, 2⅜ 70c
Gas Mod. 2⅝ $1
Flyweight " 85c

Sponge Rubber
Wheels (per pair)
2" 40c; 2½" 50c; 3" 60c.

Tin Water Sprayer 5c

PROPELLERS
Balsa Paulo Ritz
Wina Gas
5" 4c-10c Mod.
6" 5c-10c 8" 40c
7" 6c-15c 9" 40c
8" 7c-17c10" 40c
9" 8c-21c11" 40c
10" 9c-25c12" 40c
12" 10c-30c13" 40c
14" 12c-50c14" 40c
15" 15c-60c15" 50c
16" 16c-50c16" 50c
18" 25c1.25 18" 85c

RITZ Gumwood
5"-9"-10"-11" 20c
12"-13"-14" 20c

ROGERS '29' CLASS 'G' $14.15 PP.

GAS MODEL ACCESSORIES
Champion Spark Plugs ⅜ or ¼ 80c
Condensers—.02mf-200 volt....25c
Plugs & Jacks, Set of 2-35c val. 25c
Terminal Clips ⅝" 10c val. 3— 9c
Gas Funnel with Copper strainer..30c
Spaghetti Tubing 1/16" 3 ft.—10c
Toggle Switch 25c. Lightweight 15c
SAE 70 oil—½ pt. 25c. Pint....45c
12" High Tension Leads—Best....15c
Best Quality H.T. leadwire, 3 ft. 10c
Booster Leads, 75c value, per set..50c
Masking tape—½x36-instruc. card 5c
Alligator Clips—Solderless....10c
Spark Plug Wrenches—Universal 35c
Neoprene tubing per foot....20c
Dural Angle ½x½x½ 20c ft; ¾x¾x¼ 30c
Motor Mt. Sm. 15c; Med. 40c; Lge. 60c

HEAVY ALUMINUM FOIL
Perfect for covering metal-surface planes.
6' ROLL 6" WIDE 10c

COILS
Smith 3 V...$2.75
Superlite ...$1.75
Aero-Coil ...$2.25

Wing & Tail Lts. (3 in a set)
5/16 8c 9/16 10c
11/16 12c per set

TIMERS
Austin $1.50
Dural 1.95
Hillcrest .. 1.25

Battery Boxes
Lge., Med. or sm. 40c

RITZ FOLDING PROPELLER
9", 10" or 11" each $1.00

ALUM. TUB'G per ft.
1/16 .....10c
3/32, ⅛ 10c
3/16, ¼ 15c

Sheet Alum. ½ ft.
.003-.005 ....25c
.010 35c; 1.16 6x6 ....50c

KITS PLANES - SHIPS TANKS - JEEPS *OF ALL LEADING MFRS.!*

Gas, rubber and solid models kits! Largest selection under 1 roof! ALSO new, popular TANKS, SHIPS and JEEPS up to de luxe $3.50.

FREE POSTAGE ON ALL U. S. A. ORDERS. SHIPPING INSTRUCTIONS: Add 5c for insurance to assure safe delivery. Packing cost on all orders 10c. 36" or 5 ft. 20c. If outside 48 States also add 15% postage when order is over $1 and 15c if under $1. Minimum order—50c. No C.O.D. orders.

RUBBER Power Accessories
Model Pins 1" ...60 for 5c
Sheet Celluloid 5x7 3c, 14x17 20c
Ball Bearing Washer, 5/16"or7/16" 10c
Sandpaper, 2 sheets, 12"x12" ...5c
Lilliput Lights—3 lamps, wired, Instruction sheet, Per set....93c
Insignias, Four colors, 36 ass'd Amer., French, English, German, gummed, per sheet ...5c
Colored decal-squadron insignias, 5 pair per sheet, ALL COUNTRIES! 1" dia. 10c; 1½" dia. 15c
Washers, pinhole, ⅛ ...2 dz.5c
Prop Shafts, doz. sm. 6c, lge. 10c
Nose Plugsfor5c, ½"—5, ¾"—4, 1"—3.

MUSIC WIRE
.014 .....3 ft. 2c
.020 .028 3 ft. 3c
.034 .040 3 ft. 4c
.049 .....3 ft.5c
1/16" .....3 ft. 6c
3/32" ...2 ft. 10c
⅛" .....2 ft. 15c

'U' CONTROL WIRE on spools
100' 65c 50' 40c

BROWN RUB'R
1/16 sq. 3 ft. 5c
3/16 flat 2 ft. 5c
Bands ½"x8"ea.2c
*Rubber in limited quantity, sold if accompanied by order for other merchandise.

Camel H'r Brush Med. 8c, Lge. 10c
Gas Mod. 25c

Thrust Bearings
½ doz. Sm. 8c
½ doz. Lge. 12c

Celluloid Radial ENGINES
1½" 10c, 2" 15c
2½" 20c, 3" 25c
3½" 35c; 4" 50c

MACHINE GUNS
⅝" 3c, 1¼" 5c
1¼" Lewis.... 6c
1¾" Lewis.... 8c
1½" Ring Mt. 7c
1¾" Ring Mt. 20c

SKYWAY MODEL AIRCRAFT SUPPLY CO., 426 SIXTH AVE., DEPT. M, BROOKLYN, N. Y.

country, an aeronautical slant has been introduced into courses in biology, mathematics, English, social science, physics, commercial geography, and even typing, in the Boontown (N.J.) High School, in an effort to prepare young men and women for a part in the war and to make them better fitted for airminded world in which they will live after the war.

In English, many of the classics will have to give way to essays and literature having some bearing on aviation. Biology classes will be taught the "biology of flight." Mathematic classes will be taught trigonometry, geometry and algebra with the idea of preparing pupils for navigation and associated aeronautical principles. Social science classes will study the effect of plane travel on social behavior, and even stenography classes will be taught aeronautical terms.

Revised Teachers Kit Now Available

Tying in with the current movement of "air conditioning" youth, a revised edition of United Air Lines' educational kit for teachers is announced by the company.

The new kit, which marks United's third edition, was prepared by Professor W. A. Wheatley, director of school and college service. Included is a 52-page illustrated teacher's manual covering a wide variety of aviation subjects, 24 photographs of planes and air views for class use and bulletin boards, 40 photographs of planes in flight for individual students, a large poster showing combat plane silhouettes for use in identifying military planes, and various other materials. The entire kit is sent to teachers for 25c to cover the postage. They may be obtained by writing United Air Lines' School and College Service, 5959 S. Cicero Avenue, Chicago, Illinois.

According to Professor Wheatley, approximately 40,000 teacher's kits have been distributed by United Air Lines in the past two years.

Girl Scouts Introduce "Wing Scout" Program

Wing Scouting, the new Girl Scout aviation program, was introduced in New York early in October when the first training course for leaders of Girl Scout troops was held at the headquarters for the Girl Scout Council of Greater New York. The course, which is being held bi-weekly for a period of fifteen weeks, is being given under the direction of the Girl Scout national staff.

The Wing Scout program was developed and adopted by the Girl Scout organization to give girls of Senior Scout age, fifteen to eighteen, an opportunity to develop interest and skill in aviation ground work. Its aim is to prepare girls for community service in the field of aviation, to make them aware of the importance of air supremacy for the United States, and to explore career possibilities for women in aviation. Troops will be called "flights" and the program will include training in model plane construction, aircraft identification, meteorology, navigation and aerodynamics.

Gill Robb Wilson, President of the National Aeronautic Association, recently cited the "box score" of war plane losses to refute critics of American fighting aircraft. Speaking before the regular quarterly meeting of the Association's Board of Directors in Washington, Mr. Wilson said that he was "fed up" with published statements that our ships are bad or dangerous. He added

DEALERS!

DON'T BUY

—until you get our "lowest-ever" complete wholesale price list first. Bigger profits on all gas motors, gas and rubber-powered kits and supplies. Write for large wholesale catalog today.

MONTAUK MODEL AIRCRAFT CO.
4320 Sixteenth Ave., Dept. M-3, Brooklyn, N.Y.

"OK" ENGINES

The production line that sent forth "OK" engines has grown longer—**and works around the clock!**—as our men and machines toil unceasingly in the vital tasks at hand! The ingenious advances developed in this war—**AND THIS SHOP!**—will be incorporated in "OK" when we don civvies! If you own an engine—take good care of it! If you're NOT using it yourself—make it possible for another modeller to "keep 'em flying." Can our service department help?

Herkimer Tool & Model Works
Herkimer, N. Y.

A Snap To Start!

For modelers who demanded peak ignition, and manufacturers who wanted to supply the finest, Smith Coils were the standard before the war. They'll set *new* standards after the war.

Meanwhile, Smith Engineers are devoting all their skill and experience to the production and installation of precision electrical devices in many lines of Army and Navy equipment.

Modelers can help the war effort and best serve themselves by making their present model equipment *last*. Whether or not you are a Smith owner, we suggest that you write today for folder describing how to care for and *prolong the life of* your coil, batteries, and other ignition accessories.

SMITH COILS

FIRST *because they* LAST

Write us regarding ANY ignition problem

NATHAN R. SMITH MFG. CO.
105 Pasadena Avenue
SOUTH PASADENA, CALIF.

that "If this were so, I would be the first to blast our industry, for I have but one obligation and that is to the American people." Mr. Wilson lauded the performance of American built and American manned air fighters in recent engagements in many parts of the world and urged the American people to study the "box score" figures of these engagements. "That's where the bets are paid off," Mr. Wilson stressed. "What do I care what bat Joe DiMaggio uses so long as he smacks the ball over the fence? What do I care how sharp a Zero airplane can turn if the P-40 knocks it out of the sky? No aircraft has every element of superiority. Give me the ship that can hit and run and hold together, and the other fellow can have the rest of the bag of tricks."

Russell Basye of Oakland, Cal., writes on the new rules;

"I am not in favor of the 1941 A.M.A. rules. I think dethermalizers should be compulsory because of the danger to aircraft observers and also because of the danger of losing the model.

"I like the 10-minute rule because not many gas models will fly 10 minutes three times and there is little chance of a tie.

NOTICE

A letter has been received from Fentress Gardner, 2nd Lt., 84th Cav. Rcn. Troop, Camp Howze, Texas. He writes, "One of my most important jobs is to teach 250 men rapid sight identification of U. S. Army Aircraft and vehicles. Is there any way in which I could get one accurate, small scale model of every available plane and vehicle?" If any of our readers can aid Lt. Gardner, please communicate with him direct.

Stressing Your Gas Job

(Continued from page 29)

do, this torque load, in addition to the static or deadweight load of the power plant assembly, we can readily perceive the benefits to the ultimate performance of model airplane stress analysis. Actually, we will provide a suitable load factor in order to take care of the accelerations set up by flight maneuvres, or violent and sudden wind gusts. On the other hand, consider the remaining alternate possibilities: should the component structural members of the engine mount be designed with too small a cross-sectional area, or with insufficient area, the vibration of the engine propeller-unit, when added to the dead-weight load carried, could cause a structural failure with the resultant ultimate collapse of the structure; should the members be selected with too great an area, the net result will be an excessive weight, beyond all reason when the load to be supported, and the strength characteristics of the material of which the members are constructed are to be considered.

Now another difficulty arises. We have surmised that the stress analysis of aircraft structures is a highly-defined and exact science, cloaked in the deep mystery of higher mathematics. This science can, indeed, become mighty complex in its very advanced phases. However, as we have already intimated, a simplified method of stress analysis can be made available to us for model airplane engineering. This process, which employs a strict minimum of mathematical computation, is called "graphic static"—that branch of mechanics that deals with bodies in equilibrium and in which all forces acting on them can be represented by means of simple straight lines. We will obtain facility with this process as we progress.

To briefly review the field of mechanics, we find that there are, in all, three primary and, conventional methods of determining actions of loads and forces. These are: the graphical method (which we already previously mentioned) the algebraic method, and the trigonometric method. The algebraic method consists in first establishing the preliminary assumption that the sum of all the forces acting on a static or a motionless body will be equal to zero. It is then said that a state of equilibrium exists. Upon reflection, we can see that this statement is true, since motion otherwise would take place in the direction of a force of greater magnitude. With this thought in mind, algebraic equations are set up and solved, the magnitude of the individual forces being determined from these equations.

Trigonometric resolution of forces consists in solving for the angular components of known forces, or of the reverse operation. Conventional trigonometric functions are then applied, so that by either knowing or measuring the magnitudes of angles between the lines of action of the various forces involved, their vertical, horizontal, and diagonal components may be readily determined.

The graphical method employs drawing procedure almost exclusively, the magnitudes of the forces involved being laid out to some suitable scale as, for instance, 8,000 pounds equals one inch. It then becomes advisable to select a scale as large as the available space and equipment used will permit, since the accuracy of graphical stress methods obviously increases with the increase in size of the drawing used.

For model engineering, the graphical methods of stress analysis should be wholly adequate, no subsequent checking by mathematics being necessary. This is true since in all but a few isolated instances, only the minimum available sizes of structural sections will be required for fabrication of airplane models. Employ the largest practical scale when laying out the forces by graphic methods. The reader is further advised to have a suitable handbook that contains strength of materials formulas and the properties of structural sections. A protractor, scale, and drafting instruments will be essential to complete this work. By a fundamental application of the science, strength of materials, to model airplanes, the reader can more readily understand fundamentals of airplane structural design.

(Continued in next issue)

VICTORY

Air Ways

(Continued from page 26)

structural details of full scale planes. The KG formed the basis for the design of the model shown in the picture; in fact it is a KG with modernistic lines and graceful curves added to its contours. Even from the picture an expert eye will observe the excellent workmanship. The proof of this is that it has won many beauty contests in which it has been entered. In flight the ship resembles a full scale craft, not only in its general appearance but rather in its stable steady performance. More power to Joe and to the thousands of others who are now using their model training to help Uncle Sam!

Picture 2 illustrates a novel idea: A model flier uses a fishpole, reel and line to tow aloft his soaring plane. As the ship gains altitude the line unreels until the flier wishes to release his craft for free flight. The fishpole also enables the flier to maneuver the craft with ease. A quick tension or release, or movement from one side to the other, may be attained by swinging the pole.

The 1942 high-point trophy winner of the Williamsburg Model Craftsmen, Brooklyn, is Sidney November. Mario Stanislao is shown with one of Sidney's contest-winning jobs is picture 3. A ship of this design in 1941 won in every contest in which it was entered, placing or topping in all events. The original job was lost that year, with an average time of 11:42 min. The ship has a 5 ft. span with a total area of 532 sq. in.; the average flight time is 3-1/2 min. on a 15 sec. motor run.

Close observation discloses the unique airfoil; it has a high undercamber with a Phillip's entry at the nose, and trailing edge turned up slightly. This probably is a Grant G9 airfoil or one with similar characteristics. Ships with wings using this section have been consistent winners due to the unusual soaring characteristics which it gives.

Other merit award winners of the club are: Class A: Sidney November, silver

WAR or PEACE—
BERKELEY GIVES YOU THE BEST IN QUALITY AND DESIGN

★★★★★★★★★★★

Every war has found a need for a change in design. These changes have always meant improvements for peace time. We believe that the Berkeley kits now being produced are far superior to the models we were producing several years ago. Constant effort to substitute materials that are not vitally needed in the war effort have resulted in better kits that build better models.
Thousands of Berkeley kits must go to the armed forces. If your order is delayed or your dealer is temporarily out of stock, please understand, and cooperate.

THESE GREAT KITS NOW EQUIPPED WITH "AIR-TEX" DIE CUT PARTS

Air-Tex is a composition board made from wood pulp. It is extremely light, durable and strong. Air-Tex may be sandpapered in the same manner as wood, and because of its superior strength it can be used in smaller sizes leaving a model often lighter than balsa wood.

AMERICAN ACE "54"

Henry Struck Design

Designed for you by the National Champion. Thousands of these great ships have been built and flown. An official A.M.A. Record Holder on land and sea! Kit includes finished propeller, rubber wheels, formed landing gear, and liquids.

54" Wingspan
$3.95 p. p.

BUCCANEER "B" SPECIAL

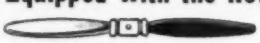
This newest BUCCANEER gives you the ultimate in safe, stable super-performance. No more whipstall or spins due to improper adjustments with the BUCCANEER "B" Special, the only gas model with wing slots and spin arresting tail. Power it with any Class "B" or small Class "C" engine. Kit includes finished propeller, rubber wheels, formed landing gear.

Featuring Stall-Proof Slotted Wing and Spin-Arresting Tail

56" Wingspan
$3.95 p. p.

RUBBER POWERED FLYING MODELS

Equipped With the New Adjust-O-Pitch Propeller



Assembled in a few minutes an "Adjust-O-Pitch" propeller is more efficient than former machine cut propellers. In a few seconds any desired pitch can be obtained and the maximum performance of the model can be easily determined.

CURTISS "CLEVELAND" DIVE BOMBER
With Automatic Bomb Release

24" Wingspan

This sensational model carries a dummy demolition bomb which is dropped in flight. A complete kit with detailed plans, "Air-Tex" parts, cement, etc..... **$1.50 P.P.**

BELL AIRACOBRA P-39

¾" Scale—27½" Wingspan. With new Phantom Drawings simplifying construction. Complete kit with insignia, "Air-Tex" parts, cement, etc..... **$1.00 P.P.**

REPUBLIC THUNDERBOLT P-47B

¾" Scale—31" Wingspan. The first authentic model of America's Newest Fighter. Complete kit with phantom drawings, insignia, "Air-Tex" parts, cement, etc..... **$1.00 P.P.**

CURTISS P-40

¾" Scale—28 inch Wingspan. Kit is complete with insignia, "Air-Tex" parts, cement, etc..... **$1.00 P.P.**

SINBAD THE SAILER

50" Wingspan

$1.00 plus 10c for postage

Another Henry Struck design. This towline launched glider equipped with Spiral Control is capable of unbelievable accomplishments. The simplicity with which you can launch it makes Sinbad a real contest winner! The ease with which you can build the ship will amaze even the most experienced builders. Kit is complete.

INTERSTATE CADET— NATIONAL FLYING SCALE CHAMPION

35½" Wingspan

Designed by **HENRY STRUCK**

$1.50 P.P.

Immediately after the Interstate Cadet won the last National Championship Meet, Berkeley engineers with the helpful assistance of the Interstate Aircraft and Engineering Corp. began to produce America's most advanced model kit. No expense was spared. Many of the details were reproduced from the full size plane by photo-reduction. Unparalleled as a flying model, it has turned in flights of over four minutes' duration. Kit is complete with formed metal parts, decal stripping, wheels, special propeller, cement, and Silkspan. **$1.50, postpaid.**

GET THIS GREAT CATALOG

You can still get one of the great Berkeley catalogs. Full of hard-to-find equipment and new kits. At your dealers or by mail 10c.

BERKELEY MODELS INC.

230 STEUBEN ST.
Dept. M 3
BROOKLYN, N. Y.

★★★★★★★★★★★★★★★★★★★★★

NEW REDESIGNED MODEL OF *Dick Korda's* WORLD RECORD HOLDER
WINNER OF MORE CONTESTS THAN ANY MODEL IN THE WORLD!! SIMPLE AS ABC TO BUILD AND FLY!!
A time-tested champion! Proven in actual competition the world's best flying model. Winner of contests everywhere—even when made by beginners.
New Features include polyhedral wing, finished all steel landing gear, instructions for one-bladed fold-back prop and numerous other modern refinements.

43" WINGSPAN 69¢
Add 15c by mail
Manufactured Exclusively by
bVRd
MODEL AIRPLANE CO.
2113-2117 East Oliver St. Baltimore, Md.
NEW CATALOG 10c
Over 100 multi-colored action drawings of modern battle and sport planes.
JOBBERS: Get this profit making line in all price classes—10c, 25c, 50c and $1.00. We are making prompt deliveries.

medal; Bernard Lavender, bronze medal. Class B: Alexander Elia, silver medal. Class C: Mario Stanislao, silver medal.

This club is composed of 40 members between the ages of 14 and 45; 20 are active and the rest are either in the aviation industry out of town or serving in the armed forces. This is a very good average for any model club, i.e. half its members serving Uncle Sam, and upholds comments in the first part of this column.

Paul Van Sant of 1428 E. 65 Pt., Chicago is interested in flying models that resemble full scale craft. If you cannot fly in a large plane at least considerable thrill can be realized by flying U-control scale models. These little ships are controlled like the big ship, by means of wires attached to the model and held by the pilot or operator. Mr. Van Sant built and has been experimenting recently with a miniature U-control gas-powered Spitfire, shown in picture 4. It has a span of 45 in., powered with an Ohlsson 60, wings are covered with silk and doped. Mr. Van Sant says that it is a beautiful flier but is not extremely fast, only about 47 mph, but what it lacks in speed it makes up in maneuverability. It can dive straight down within 10 ft. of the ground and pull out and Mr. Van Sant says it is the only plane he has seen that can be flown straight up. It has been flown in rain and snow, the latter leaving telltale tracks to show how the model takes off and lands. The landing run can be measured easily in this manner.

Picture 5 shows the model in a steep climb after takeoff. The run and the point of takeoff are clearly indicated in the snow.

Picture 6 shows the model just after it has landed. You will note that there is a break in the snow tracks, indicating that the model hit the ground, bounced slightly, then struck the ground 4 ft. further on, finally coming to rest after a short run. The control line may be seen attached to the fuselage on the right.

Ray Crupi of 2466A N. 49th, Milwaukee, is an ardent scale model fan and sends us a picture, 7, of his Grumman XF5F-1 twin engine interceptor. Though a solid scale model, it has been carefully shaped and includes many interesting details such as guns, gun sights, radio mast, instrument board and pilot seat. Speed indicator tube is shown realistically at the tip of the left wing. The little model required 60 hours to complete and was built to 1/2" scale.

A unique model built by Wendell Zimmerman of 1416-1/2 Greenfield Ave., Westwood Village, Los Angeles, is shown in picture 8. It features a new laminar flow wing and new fuselage design. The landing gear is detachable in flight if desired. Zimmerman says he will stack this one up against any ship he has seen in flesh or flight. You will note that the propeller is located well ahead of the motor on the end of an extension shaft. The cooling air is closely ducted around the fins of the motor, part of it flowing into the carburetor, the balance passing out to the rear of the maximum section of the fuselage. In this way Zimmerman gets the same effect as a slot in a wing, reducing the drag back of the maximum fuselage section.

The model has been flown at about 70 mph with fairly large wings carrying 1-1/2 lb. per sq. ft. In the picture it has been fitted with smaller wings which carry over 3 lb. per sq. ft. It has not been tested with these wings but Zimmerman says "I intend to take it out at the first opportunity. The whole job was calculated from start to finish and you can add my name to those who get a thrill from seeing their handiwork turn out as planned."

Scott Barker of 1141-1/2 N. Cummings, Los Angeles, "loves to fly" but being unable to fly large ships he has turned to building and flying models, scale, rubber powered and gas. He says:

"I work at the Lockheed Aircraft Co. and have not come in contact with many other model builders, there being only a very few who work at the plant that I have met. I know there are quite a number who have gas jobs but have no way of contacting them, so I hope that many who read MODEL AIRPLANE NEWS will see this notice and contact me in order that an active model club can be formed."

Picture 9 shows one of Barker's recent gas jobs; it is a very sleek looking flier.

Considerable experimenting is being done with U-control but here is one, picture 11, that appears to be the result of the extremely high flight of John Capo's imagination. It is mostly motor and propeller though he has condescended to equip it with streamline wheels and stubby wings so that it can takeoff, fly and land. When the cowl is in place it looks very much like a teardrop with a small fin and stabilizer attached at the rear. It has given some excellent flights. The stabilizer is placed high, well out of the turbulent airstream from the wing. When in this position stability and control is increased.

Many forms of dethermalizers have been tried out. Usually the method is to destroy the airflow over the wing thereby reducing lift. Another method is to release a parachute which trails and acts as a drag, slowing down the model so that it sinks rapidly. Mrs. Betty Geisen has worked out still another and very unique system. At the end of the flight a timer trips the rear fastening of the stabilizer which is then pulled up into the position shown in picture 12. This throws the ship into an extreme stall so that the wing, when descending, meets the relative wind at an angle greater than the stalling angle. In this manner the wing is induced to give very little lift and acts merely as a parachute. In the picture Mrs. Geisen seems highly pleased with the results of her handiwork; she should be—it operates very successfully.

Picture 10 shows Joe Scuto with his U-control scale model of the Brewster F2A-2. The large prototype participated in the defense of Java. One of the thrills of U-control flying is the realistic effect produced by scale models tearing through the air at 60 mph, accompanied by the customary engine roar. The two control wires can be seen passing out of the two small holes in the body beneath the wing and extending spanwise through two wire braces. The long U-control wires held by the pilot are connected to the ends of these two stubs and through them the elevators are operated, causing the ship to climb or descend.

An unusual piece of model work is shown in pictures 13 and 14. The plane is a Curtiss P-40 Tomahawk with 28" wingspan, built by A/C Kenneth E. Nordling of Boise, Idaho, and presented by him to Capt. R. V. Crowell, Commanding Officer of Group A Hdqts., San Antonio. The craft is built in such detail

RED CHIEF INSIGNIA DECALS!
Get bright COLOR Squadron Insignias! Authentic, official designs of U. S. Air Corps. Lively, attractive. Genuine Decals. Soak Em—Slide Em—Stick Em for PERMANENT wear. 6 pairs (12 decals) 1" size, 12 for 10c. Also comes in 1½" size, 12 for 15c. Send coin, no stamps. Illustrated literature on request.
RED CHIEF INDUSTRIES
2326 S. Michigan Ave.
CHICAGO, ILL.

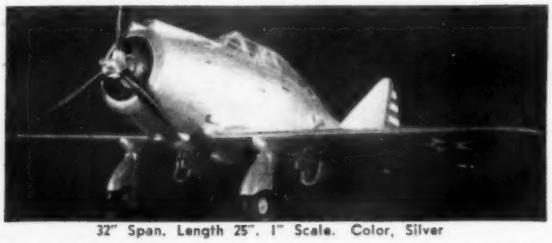
GRUMMAN F3F1

U. S. NAVY SHIPBOARD FIGHTER

32" Span. Length 24". 1" Scale

A fine detailed model with retractable landing gear, 4" turned balsa motor front, 3 oz. grey dope, ½ oz. yellow, 2 oz. glue etc., all parts printed on balsa, 10" propeller, wheels, rubber motor, full size drawing, and all parts. This fighter plane is used in large numbers on the aircraft carriers. Const. Set complete, postpaid. **$3.75**

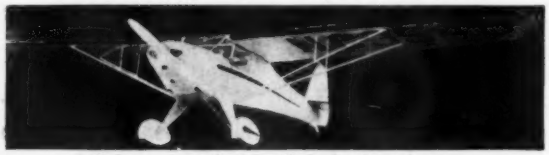
SEVERSKY P35A ARMY PURSUIT



32" Span. Length 25". 1" Scale. Color, Silver

Set has 4" turned balsa motor front, 10" carved prop, balsa wheels, tail wheel, rubber, all parts printed on balsa, 3 oz. silver dope, ½ oz. black, 2 oz. glue, etc., insignia, and full size scale drawing. New improved model has retractable landing gear and movable controls from cockpit. Set, postpaid..... **$3.25**

TAYLORCRAFT SPORTPLANE



36" Span. Length 22". 1" Scale. Weight 2 oz.

A beautiful exact scale flying model with unusual flying range, so light it will rise from land in 6 feet. Const. set contains all parts printed on balsa, carved propeller, hardwood wheels, 2 oz. white dope, ½ oz. black, glue, full sized scale drawing, and all parts to build. Set, postpaid..... **$1.50**

NEW BELL P39 AIRACOBRA U. S. ARMY FIGHTER

34" Span. Length 29". 1" Scale

The best detailed P39 on the market. Model has retractable gear, paints, and all parts. Construction set, postpaid..... **$3.50**

All illustrations shown here are actual photos of our finished models. Due to the defense requirements, it may be necessary to furnish harder wood than balsa for some of the parts. We ask your co-operation.

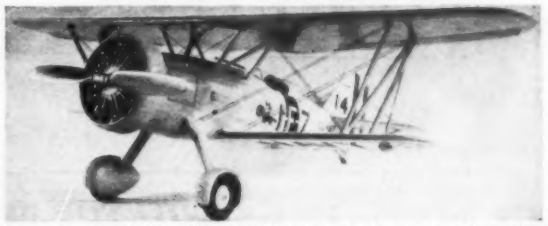
BOEING B-17 FLYING FORTRESS BOMBER

44" Span. Length 30". Color Silver. Weight 6 oz.

THE MOST SENSATIONAL EXCLUSIVE BOMBER SET IN THE WORLD

Set has all parts printed on balsa, four 2" special finished motor fronts, four 4" carved props, celluloid wheels, set of paints, glue, and full size drawing. Set, postpaid **$4.50**

CURTISS HAWK F11C4 PURSUIT NAVY



32½" Span. Length 22¾". 1" Scale. Weight 6 oz. Color grey, top wing yellow

THE MOST EXCLUSIVE AND FINEST EQUIPPED MODEL IN THE WORLD. MOVEABLE CONTROLS WORK FROM COCKPIT. A special de luxe model, one of the most beautiful ever made. Set contains a 4½" scale Wright Cyclone celluloid motor, detailed push rods, fins, etc., like real motor, 4½" aluminum cowl, 10" steel type carved prop shown, 2⅛" wheels, tail wheel, star and rudder insignia and lettering, windshield, instrument board, flying wires, 4 aluminum step plates, aluminum wing walks, ready cut wheel pants, washers, 3 oz. grey paint, ½ oz. yellow, ½ oz. red, 2 oz. glue, etc. All other parts are printed on balsa wood 33"x44" scale drawing. Const. set, complete in labeled box, postpaid..... **$4.50**

REPUBLIC P43 LANCER SOLID

14" Span. Length 10". ⅜" Scale

READY-BUILT MODEL **$15.00**

Set has completed finished fuselage, headrest attached, cockpit cut out, etc., scale cast motor, cast propeller, wheels, paints, wings, etc., cut to shape, drawing, etc. Set, postpaid..... **$2.25**

NEW CURTISS P40F WARHAWK SOLID

14" Span. Length 11¾". ⅜" Scale

This and our F11C4 are the finest solid sets in the world. Set has completely finished balsa fuselage, turned spinner, routed out cockpit, paints, glue, insignia, wheels, drawing, etc. Wings, tail and rudder cut to outline. This Masterpiece set, postpaid..... **$2.50**

Ready-Built Model $16.00

NEW CATALOG

Large 6" photos of latest models, gas models, motors, etc.
New Catalog No. 8
Send 10c coin

ORDERING INSTRUCTIONS

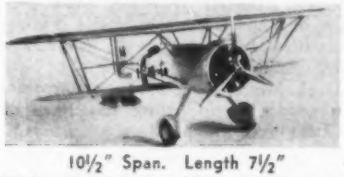
Orders sent west of Mississippi, add 15c postage—Foreign, 20c.

BOEING F4B4 NAVY FIGHTER

22½" Span. Length 14½". ¾" Scale

Set has ¾" celluloid motor, 3¼" tapered aluminum cowl ring, set of paints, all parts printed on balsa, drawing, etc. Set, postpaid..... **$2.95**

CURTISS F11C4 SOLID MODEL

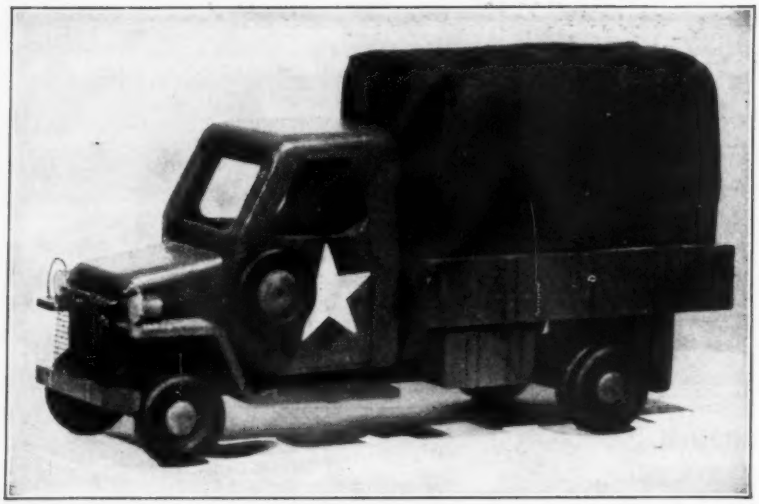


10½" Span. Length 7½"

Set has completely finished balsa fuselage, cockpit cut out, wings cut to shape, 1½" deluxe cast motor, alum. cowl, 3 bladed cast prop, paints, drawing and all parts. Set p.p..... **$1.75**

MINIATURE AIRCRAFT CORP.

83 DANIEL LOW TERRACE
STATEN ISLAND, N. Y.



IT'S HERE! IT'S NEW!! IT'S DIFFERENT!!!

It's a Model U. S. Army 1½ Ton Truck. It's EASY to build. All parts cut and LETTERED to correspond with FULL SIZE plans. De luxe pine kit including free-rolling wheels of finest Canadian spruce, khaki tarpaulin, radiator grille, bumper, windshield, etc., etc. It's the Army Truck model *you've been waiting for*—in accurate ½" scale.

Only $1.25 10c Postage

GLENDALE HOBBY SHOP 140 S. BRAND BLVD. GLENDALE, CALIF.

Enclosed $1.35. Send model 1½ Ton Army Truck postpaid to

Name .....

Address .....

City ..... State .....

that it is difficult to distinguish whether or not it is full scale or miniature. It has a sliding canopy, retractable landing gear with unique structural detail, movable controls, wing lights, cooling flaps, wing flaps, tabs and a complete set of cockpit instruments from fuel selector valves to gun charges.

In picture 13 the machine guns can be seen protruding from the wing and above the fuselage and the nose.

Usually it is easy to tell a model from a full scale job by noticing sections of the ship where parts join, for instance, around the soldering work; however in this ship there are no telltale irregularities of structure or finish. It is as near to being a perfect job as any model builder can ever hope for. Mr. Nordling is congratulated, also A/C Harold Austin of Oakland who took these excellent pictures.

Club News

Montreal

We hear from Mr. Walter R. Allen, secretary of the Montreal Model Flying Club, with headquarters at St. Paul Community Clubhouse, 5709 Brissette St., Cote St. Paul, Montreal, Que., Canada. Mr. Allen sends the following few lines of the Club's activities:

"We are at present working on a wind tunnel in which to test out our pet ideas as regards the problems of flying gas jobs. All of us have our pet theories as regards these of course. The tunnel will give us, we hope, a chance to test out all these ideas; then we will be able to enlarge them. We have an instrument to test our motors and props for pull and thrust directly. It was made by our President, Stan Cole."

Southern California

The war has not dampened the spirits of Californian model fans sufficiently to eliminate their annual contest, for on Dec. 6th the Gas Model Airplane Assn. of Southern California, Inc., held its 13th semi-annual contest in accordance with its established custom. Site of the event was the model airport on Rosecrans between Western and Crenshaw Avenues. Mr. William L. Butler has been kind enough to send us a complete report.

Just lacking by one day a year ago when busy modellers were startled out of their concentration on winning a contest by the news that came over the radio. At first thought the Board of Directors were doubtful as to whether or not the contest should be held this year on account of gas rationing and lack of materials and supplies. As it turned out the meet was the usual success that all thirteen of these gas model classics have proven to be.

The layout of trophies, while not as numerous as in other contests where they went down to ten places in all three classes, were the finest ever offered. Much of the credit for these goes to Ray Acord and Ted Gillette who covered lots of ground and worked hard obtaining trophies and cash; also to Chuck Blecksmith who is president of the club and was director of the meet. In addition to the trophies there was $125 in cash prizes distributed; $25 for first in each class, $10 for second and $5 for third. There were 168 entrants, somewhat less than the usual 200 to 300, but still good. Over 900 spectators passed through the gates and donated a dime, so well over a thousand people witnessed the event.

The first half of the meet was held without benefit of thermals but along in the early afternoon they showed up as evidenced by six or eight models at a time lazily chasing each other in circles around the coveted thermal. Then long flights began and winners were the lucky ones who were able to fly at that particular time.

The meet was an open contest for Class A, B and C gas models. The only restrictions were a 20-second motor run and weight rule to determine the class. The model had to weigh 80 ounces per cubic inch displacement of engine. Two flights were allowed and the total of both flights counted.

Class A, contrary to being the "baby" it used to be, gave the longest flight in sight of timers. It was won by Bob Holland with a total two-flight time of 24:17 min., using an original parasol type monoplane with a Bantam engine. Bob also won the trophy for longest flight of meet, which was 21:58 min. Second place in Class A was won by Ted Gillette of Hollywood with a time of 16:43 min., using a Playboy with Twin-Elf engine. Third place, 10:30 min., went to Ray Acord, also of Hollywood, who used an original design with a Twin-Elf engine.

Class B winner with a total time of 16:57 min., was Sam D'Angelo, using a Zipper with an Ohlsson 23 engine. Second in this class went to Frank Cummings of Los Angeles with a total time of 15:21 min., using a Zipper with a Torpedo engine. Third place to Ocie Randall of Fresno, using an Arrow design with a Phantom motor and having a total time of 13:52 min.

Class C, which is usually the big struggle in any contest, was won by Jim Caldwell of Los Angeles with a total two-flight time of 21:44 min. Jim used a Playboy Senior with an Ohlsson 60 motor. Second place went to Frank Cummings of Los Angeles with a Sailplane and a Super-Cyclone engine. Frank's time was 20:50 min. Third place went to Bill Butler of Inglewood, using a Westener and a Super-Cyclone engine, who was credited with a total time of 16:43 min. This flight was quickly out of sight of the judges and was chased for over an hour for a distance of approximately twenty miles. Then Bill had to return to the field without the ship as it finally headed towards South Pasadena. On arriving at the field two hours later he was agreeably "perked up" by being handed the trophy for third place and the $5 check that went with it. Later in the evening the phone rang and sure enough the good old Westerner had landed in an honest man's back yard away over on the other side of Los Angeles and was there waiting for the owner. The model was retrieved. This flight of over one hour duration was undoubtedly the longest of

CLEAR AWAY THE COBWEBS

BRUSH OFF THE GATHERING DUST!

We're 'sending solid'—right on the beam with the most representative choice of solid-model kits available today! Whatever your contemplated project—small, medium, large—'if it's available' it's here at Polk's!

Pity the gas engines and finished models which are pining away in storerooms, dens, clubrooms, even under many beds across the nation. Now is the time for every good modeller to come to the aid of his country: TAKE 'EM OUT OF RETIREMENT, PUT 'EM BACK IN SERVICE! Donate or sell your unused equipment. If no market exists near you, we will be pleased to cooperate with you. Bring or mail your engine for immediate cash. Advise what other equipment you may have for restoration to use, large or small, we want to 'KEEP 'EM FLYING'.

CUT-TO-OUTLINE SHAPE

WINGS—FUSELAGE—TAIL SURFACES

¼" scale kits with cut-to-outline shape fuselage, wings, tail surfaces, turned wheels, simplified construction plans! Choice of Japanese ZERO, Russian STORMOVIK, LOCKHEED P-38 (Lightning), GRUMMAN WILDCAT, N. A. MUSTANG, CURTISS P-40, B-J SEAPLANE, STUKA DIVE BOMBER, GLOSTER GAUNTLET, DOUGLAS ATTACK.

50c EA. (By mail: 10c postage-packing per kit!)

BOEING P-26A, HAWKER HURRICANE, HAWKER FURY, HAWKER P6-E, CURTISS P-37, SEVERSKY P-35, BELL P-39, MESSERSCHMITT, SPITFIRE, HEINKEL, DEFIANT, RYAN, N. A. APACHE, CURTISS KITTYHAWK.

35c EA. (By mail, 45c each, or any 5 for $2.00).

AIRPLANE BOOKS

Model Aircraft Handbook: $2.00. 300 pgs., 100 illus. By Wm. Winter (Air Trails): Model Airplane Design $3.75, 528 pgs., 205 illus. By C. H. Grant (M. A.N.): Aerodynamics for Model Aircraft, $3.00, 257 pgs. By Avrum Zier: Building & Flying Model Planes, $2.00; Youth in Aviation (Program manual for leaders & Contests) $2.50; Model Airplane Contests (Official rules, etc.) $1.25. How To Get A Job in Aviation, 96 pgs. By C. F. Matoen (Curtiss-Wright) 25c. Flying Models—How to Build Them and Fly Them, 30c; Tom's Book of Flying Models, 15c.

XACTO $2.00

Treat yourself to a marvelous knife set. Makes modelling easier, faster and neater. Set has 2 handles and 12 different blades. FREE book on building solids with each purchase.

XACTO 50c ea. No. 1 for fine work; No. 2 for heavier work. With one blade. Xtra blades, choice of 10, 10c each.

STINSON RELIANT 30" 65c

SKYWAY KNIFE INCLUDED! Popular model, detailed plans with turned nose, all balsa. Kit alone valued at 69c, special, only POSTPAID **65c**

C-Z Scale Models

Easy-to-build realistic models. These kits (last for duration) include aluminum covering, balsa parts cut to outline shape, cast props, detailed motor-fronts, rubber wheels, and all accessories.

Metal Covered

BOEING STRATOLINER (21") $4.25; REPUBLIC GUARDSMAN 13¼" DIVE-BOMBER $2.75; VULTEE VANGUARD 13¼" FIGHTER $2.25; CURTISS HAWK 13½" $2.25; Spartan Executive $1.75; Consolidated PB2A $1.25; Grumman F4F3 85c; AIRACOBRA 85c. Northrop 85c.

New Non-Critical Material Models

Redi-Colored, numbered parts! Avenger 85c; Hell Diver 75c; Curtiss P40F or Thunderbolt 50c; Hurricane or Spitfire 60c. New, intriguing construction technique!

GLIDER KITS . . .

CONDOR $1.00

Advanced soarer, 7 ft. Class "E," 324 sq. in. wing area. For towline or hand launching.

SINBAD $1.00

50" span glider with spiral control for towline launching. Releases automatically at peak of launch.

EAGLET 50c

4 ft., pod shape fuselage, unusual tail boom. Class "D" Towline or Hand Launch.

EVERY KIT BY CLEVELAND YOURS FOR THE ASKING

Come in—see the kit you plan to construct, study the plans! We carry the complete line for immediate delivery right over the counter, or by mail if you're at a distant point! From the enormous 2" to ft., radio control STINSON ($12.50) to the extra-value 50c glider—WE HAVE 'EM ALL!

LOCKHEED HUDSON $7.50

Big 49⅜" span model of powerful bomber and reconnaissance plane. An advanced project for serious modeller! Super-detailed, complete kit!

REPUBLIC THUNDERBOLT $4.00

30¾" span model of Army's flying "battleship" Lightning-fast, 8 mile ceiling, terrific fire power. Detailed down to 4 blade prop.

GRUMMAN WILDCAT $3.00

27⅞" span model of famed Navy Carrier and Marine fighter. Best known for prodigious feats in Solomons and other Pacific actions!

SUPERMARINE SPITFIRE $3.00

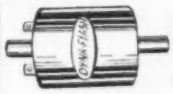
27½" Master Model of "The Pride of The R.A.F." Unusually interesting model project, featuring larger-than-average wing area!

CURTISS P-40 $3.00

28½" model of the famed TOMAHAWK! Has scalped the enemy on every front in this war. Dressed Lightning flyer. Camouflage instructions included.

UP-TO-DATE HOBBY CATALOGS PUBLISHED BY POLK'S

Produced "by and for" practical hobbyists, Polk Catalogs are popular for the wealth of information furnished, the numerous illustrations included and the varied selection-choice they offer! You'll enjoy scrutinizing these books because they're written in the language of YOUR hobby! HO-TRAINS: 128 pages, 25c*; POLK'S SHIPYARD 128 pages 25c* Revised AIRPLANE-SUPPLY Guide 5c (*25c CASH VALUE COUPON in each!)



DYNA FLASH COIL

For all A, B or C motors. Quick start, low drain, lightweight (1⅞ ozs.). Unconditionally guaranteed **$1.75**

POLK'S "ECONOCOIL"

delivers a fast, hot spark. For A, B and C engines, fitted high-tension terminal and lead **$1.00**

HURLEMAN BIG CARBURETOR

Made integral with 1¼ oz. capacity metal tank. Easy to take apart for cleaning. Designed for large bore motors and midget racers. Increases R.P.M. up to 1500 "turns." **$3.50**

MEDIUM CARBURETOR

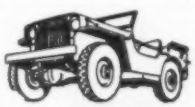
¾ oz. tank made integral with carburetor. Speeds up R.P.M. Easily taken apart for cleaning. Use upright or inverted. **$3.00**

HURLEMAN SPARK PLUG

Finest made! Fits all motors having ⅜" x 24thd. Made in 2 pcs., with pointed electrodes. Easily taken apart for cleaning **50c**

PRECISION SCALE KITS

Cardboard kit 29c (plus 10c postage) ½" and 1" wood and combination kits (super detailed) 50c and $1.25 POSTPAID.



FOLDING GAS PROP

Improves flight and glide! Select birch, lacquer finish. Stamped hub. 8", 9", 10", 11", 12", 13", and 14". **$1.00**

LIGHTNING P-35, 50" $1.95

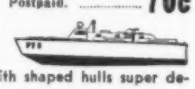
450 mph. Interceptor-fighter! The plane that's doing a terrific job in African 2nd front, and elsewhere! Complete Kit $1.95 (by mail, 30c add'l.)

IDENT-O-PLANES

24 silhouette models of Allied and enemy planes. Ideal for spotter recognition study, can be converted to gliders. Postpaid. **70c**

TORPEDO BOAT

Heroic Mosquito boat—writing naval history. 16" long, $1.00. Others with shaped hulls super detailed $2.50.



DESTROYER $1.00

Greyhound of the sea. Guard convoys. Poison to submarines. 20" long.

FREIGHTER (19") $1.00

U. S. Merchant Marine ships make the life line to Europe. Lots of detail.

Also: Harbor Patrol, Subs, Ore Boats, Tankers and Old Time Sculling Vessels.

WIND TUNNEL

Here's what every scientific and serious modeller has been waiting for! For your own, club or classroom use. Made of durable materials and includes complete directions for demonstrating many aerodynamic theories and several test models. Accurately indicates lift and drag forces to 1/100th ounce. Measures 26" high, 27" wide, 41" long. PLACE YOUR ORDER NOW. PRICE ON REQUEST.

POLK'S Model... ...Craft HOBBIES

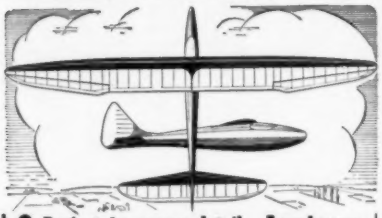
[DEPT. MA3] 429 7th Ave., New York

(Bet. 33rd & 34th Streets)—Entire 2nd & 3rd Floors

Daily 6:30 P.M.
Thurs. 9:30 P.M.

THE NATION'S Leading HOBBY House!

"Thermic 50"



● Perfect in every detail. Aerodynamically clean. Spirally stable. Easy to tow straight overhead. Sturdy but simple composite construction. Designed to give you complete satisfaction and flying happiness. You will really enjoy building and flying JASCO's latest "THERMIC 50"!

Price $1.00 By Mail Add 15c

The kit is complete except for clear dope. Special Finishing Kit, 2 oz. of clear dope, red trimming dope, masking tape and balancing clay can be had by including 35c in your order. Plans alone, 20c, P. P.

Why not order few Thermic 20s (35c) and Thermic 18s (20c) with "50" and save P. P.?

DEALERS: These kits are available for distribution. Service is dependable.

JUNIOR AERONAUTICAL SUPPLY CO.
203 East 15th Street New York City

Proven Superior Racing Fuels

NEW—
Power Mist Aero blended fuels with castor oil lubricant, for plastic tanks.
11 engines favor No. 1 blend, qt. container....75c
9 engines favor No. 2 blend, qt. container....65c
5 Methanol base fuels—Compounded for various atmospheres, compression ratios and timing.

Prices 10c higher East of Rockies.
Full information and fuel facts.
Please enclose addressed stamped envelope.

FRANCISCO LABORATORIES
3787 Griffith View Dr. Los Angeles, Calif.

If your
MODEL AIRPLANE NEWS
ARRIVES LATE

please remember that transportation and deliveries are rather uncertain in wartime. ● Model Airplane News leaves the plant in what would ordinarily be plenty of time to reach you on or before publication date. But conditions beyond our control may delay its arrival.

Latest Developments in
RADIO CONTROL

A booklet written for the radio control beginner as well as the expert. Features—"The theory of the RK-62 receiver"—"Control devices"—Table of A and B batteries—A comparison of the electrical and mechanical qualities of bakelite, steatite and polystyrene—Self-neutralizing escapement—sequence solenoid—rubber powered selector—rubber powered indicator—"Radio Control Circuits," an article written in answer to the questions asked in the thousands of letters received by us. Eighteen different radio control hook-ups with hook-up diagrams.

Ask your dealer or send twenty-five cents for illustrated Instruction Manual. Stamps will not be accepted.

Radio Control Headquarters
P. O. Box 214 Deal, New Jersey

the meet but not within sight of the Judges, however. This Westener is similar to that designed by Don Foote of Oakland, who holds the ROG three-flight average AMA record of 24 minutes plus, as well as the seaplane record of three-flight average of 2:48 min.

During the course of this long flight there were opportunities for reflection and especially when the ship was finally given up as lost. True, there was a proved, workable parachute type dethermalizer aboard the ship but the timer had been set for two minutes and was therefore disconnected so that it could not function and interfere with the chances of winning in the contest. Had it been set to function in 20 minutes, full time in the contest would have been credited and all that chasing would have been avoided. There is real need for a light, simple, reliable dethermalizer to bring the models down at a predetermined time (not necessarily 4 minutes but 10 or 20 instead). The Triple Win Club Trophy, which was donated by Douglas Aircraft Company of El Segundo sometime ago, was finally won by GMAASC. This was for the third consecutive time and is now their pride and joy. The Junior Trophy for fifteen years of age or under was won by Bob Hanford of Ocean Park who made two flights totaling 12:25 min.

Sweepstakes Trophy went to Frank Cummings who made more points than any other individual contestant. Frank is a most excellent all-around modeller and was entitled to the title of "Champion of the Meet."

Fresno

Five members of the Fresno Gas Model Airplane Assn. went to Los Angeles to attend the statewide contest held on Dec. 6th. They returned with a number of prizes won in competition with the 168 model fliers. The Fresno fliers, who placed second in the meet as a team, were: Ocie Randall, Tex Marbut, Paul Nieto, Wesley Trumble and Joe Menezes.

Randall placed 3rd in Class B with a 2-flight total of 13:57 min. He also was 5th in Class A. Menezes placed 4th in Class A and Marbut was 6th in Class B.

VICTORY

Soviet Stormavik

(Continued from page 21)

to Russia for the purpose during 1936 to 1938. The pilot is located in cramped quarters amidship, fully enclosed in a sliding canopy.

Wings are full cantilever, built up on a framework of three heavy spars interconnected by channel-type ribs, covered with flush-riveted aluminum alloy skin plating. The ailerons are fabric covered, controlled by external horn and push-pull rods. Split trailing-edge flap panels are used, also fabric covered and hydraulically operated. The wing is built in three sections, center section which is an integral part of the fuselage and two outer panels which are securely bolted to the outboard end of the center section.

The tail surfaces are of elliptical planform, full cantilever construction, the rudder and elevator being fabric covered. Both of the latter as well as the right aileron are equipped with trimming tabs controllable from the cockpit while in flight.

Landing gear is the dual-oleo type partially retractable. Each wheel is supported by two shock struts which hinge at their upper fittings about a spanwise axis. The drag link is actually a large channel section which breaks in the middle and folds upward, swinging the gear aft and upward. Two clam-shell doors are actuated by the struts' movement and fold upward to completely close the compartment, with the exception of a portion of the tire which remains in the airstream. Large, streamlined housings project forward of the wing leading edge to accommodate the struts as they rotate.

The Stormavik is powered by a single Mikouline M-38 liquid-cooled engine. This powerplant is the conventional four-cycle 12-cylinder type arranged in two banks of six cylinders each rotated 60° apart. There are three carburetors for each bank of six cylinders fed from a centrifugal-type supercharger mounted on the aft end of the crankcase. The engine develops 1250 hp. at 2100 rpm and has 1300 hp. available at 2500 rpm for takeoff. Spur-gear drive in the nose accommodates the all-metal three-blade controllable-pitch propeller. Cooling is by anti-freeze-water solution which is cooled in a radiator located beneath the ship's nose at the juncture of the wing and fuselage.

The Stormavik is one of the world's most heavily armed and armored planes. Armament consists of a variety of heavy calibre guns arranged in various combinations. The earlier models are known to have carried three 20 millimeter shell-guns mounted as follows: one gun mounted between the banks of the engine, projecting through the reduction gearing and extending from the hollow nose of the propeller spinner and one gun mounted in each outer wing panel. Ammunition for these guns is delivered by a spring-wound power feed which is given its initial tension on the ground, and in the air the firing of the gun winds the spring a turn each round of fire thereby providing constant tension on the ammunition belt. In addition to this formidable array of firepower, the ship carries two .50 calibre rapid-fire air-cooled machine guns in each outer wing panel which are belt-fed in the conventional manner. Extremely large quantities of ammunition are carried, some estimates running as high as 2,000 rounds of .50 calibre and 1,000 rounds of 20 millimeter ammunition for each gun. This is fully twice the amount carried by American planes equipped with such weapons.

From latest photographs of the Stormavik, however, it appears that the nose gun is no longer carried and two 20-millimeter cannon are now mounted in each outer wing panel in addition to the two .50-calibre machine guns. This would most certainly make the ship one of the most heavily-armed planes in the world, being on a par with England's famed Spitfire and our own Mustang fighter.

In addition to this array of hitting power, the Stormavik carries nearly 1,000 pounds of bombs in various assortments ranging from the huge 550-pound demolition bomb

(1) to the 20-pound fragmentation bomb (24) so destructive against troop columns. Normal missions are usually carried out with eight 110-pound bombs slung under the wings.

Russia was one of the first air powers in the world to recognize the importance of armor plate in aircraft and during the Spanish revolution, in which several squadrons of Russian planes and pilots participated, the I-16 Rata fighter, which looks for all the world like the famous Gee-Bee racers of several years back, was equipped with a sheet of armor plate curved around the rear of the pilot to protect his head and shoulders. Through the intervening years Russia has kept apace of the rest of the world in development of armor-plate protection for its combat planes and the Stormavik easily is the world's best armored plane. The entire cowling surrounding the engine is of 8 millimeter steel armor plate, the fuel tanks on either side of the fuselage within the center section are completely covered with 8 millimeter plate and the engine coolant radiator is completely encased in armor protection. The pilot's windshield, two side panels and top panels are of 2-inch bullet-resistant glass and the portion of the enclosure just aft of the sliding canopy is of 8 millimeter rolled armor plate.

In addition, the pilot's seat with exceptionally high back and head rest and large side plates is constructed of armor-plate steel sheet. This huge weight of armor plate in comparison with that used on similar planes of other nations is exceptional, but it has made the Stormavik one of the most rugged planes now flying in action, for on occasions too numerous to mention it has flown through deluges of enemy machine-gun and cannon fire and returned safely to its base. Colonel Mikhail Gromov, who commanded the famed A.N.T.-25 bomber which established a world's long-distance record on July 13-15, 1937, with a flight from Moscow to San Jacinto (Los Angeles), California, has returned unharmed in a Stormavik from a flight over the lines with a total of *six hundred* bullet holes in the structure of the airplane.

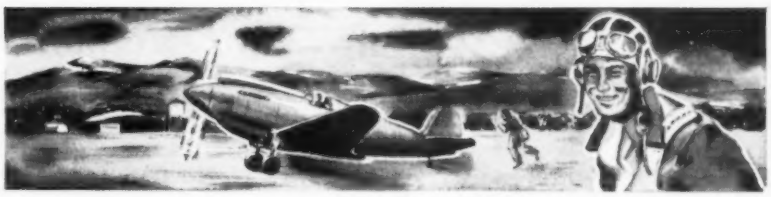
The Stormavik has been used exclusively as a ground cooperation machine and has been immensely successful in attacks upon troop columns, motorized infantry, armored cars, tanks and aerodromes. One Stormavik over the Central Front destroyed a total of *forty-four* tanks in a single day's operation and the type has broken up and routed innumerable tank attacks. Flying at low altitudes, with their cannon blazing, the Stormaviks rush down the line of attacking tanks at right angles to the path of progress and smash the turret and unprotected treads and side-plates of the tanks, putting them out of action and killing the crews.

It is often claimed by Stormavik pilots that their squadrons have destroyed more planes on the ground than all the other fighters of the Red Air Fleet have in the air. Although this is only an idle boast, it bears the possibility of truth, for many, many dispatches from the Central Front (where the Stormavik seems to have been used most extensively of the three major campaigns) have recounted huge numbers of German machines destroyed in low-altitude raids by Stormaviks.

The Stormavik squadrons are not without their clever combat tricks either, for one story relates a tactic successfully used by them over a period of many months. A squadron of Stormaviks takes off and flies over the enemy lines protected by a number of fighters high in the sky above them to ward off marauding enemy killers should such be in the vicinity. After flying to the north or south of the enemy's aerodrome, Stormaviks drop down to near-ground level and race for the airport. In the meantime a squadron of heavy bombers has taken off and started for the Luftwaffe field with a great fanfare flying at a medium low altitude so as *not* to escape detection. After a few minutes flight the bombers return to their base, but the alarm has already gone out to the Germans who quickly wheel all their available flying equipment out and warm it up to repulse the raid. At this instant the Stormaviks roar in at tree height from seemingly nowhere and thunder down the rows of parked enemy fighters blasting them to wreckage in as short a period of time as it takes to relate it.

It seems quite probable that this trick is still being used, for actually there is no defense against it; if the Germans fail to assemble their fighters the bombers continue over and destroy other targets of far greater value.

Another tactical operation is the dispatching of a single Stormavik along a



IF YOU CAN'T TAKE IT WITH YOU

The ranks of flying modellers have been thinned of men and young men who flocked into the fighting ranks and production lines . . .

. . . in the wake of these thinning ranks there remains a vast array of model equipment, pathetically dormant while owners concentrate all their time, all their energies to the task at hand.

If all this equipment—NOW IRREPLACEABLE!—were released model flying could continue side-by-side with the war effort without draining any vital materiel-source.

The foremost authorities in our land have stressed the importance of continuing this program!

IF YOU CAN'T take your hobby with you; if military service or defense employment has "blacked out" your participation for the duration, the most patriotic gesture would be immediate "unfreezing" of any items which may be gathering dust for lack of use.

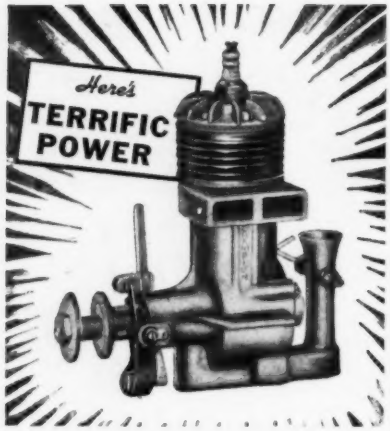
***Take stock:* What do YOU own which some fellow modeller might use? Pass it along! Loan it, donate it or sell it, but keep it in action, "keep 'em flying!"**

Your ATOM dealer will gladly assist you in this program. His natural interest, in these difficult times, is "to keep 'em flying!" Why not take your idle ATOM (or any motor—regardless of age or condition) and talk it over with him!

A NEW Super ATOM* ½" bore and stroke—weighs 2 ounces. *Still available in some Hobby Shops.... **$15.50**

MICRODYNE ENGINES
Box 245-A, Gen'l Post Office, New York, N. Y.

SUPER Atom



ATTENTION FELLOWS!!

You can still purchase a powerful, reliable and dependable engine for that model airplane, racing car or speed boat!

CHAMPION MOTORS

Order now as *only a few* are left. The "Champion" was designed by Bill Atwood and has established many records.

Fully Guaranteed. $18.50

Includes tank, coil and condenser
(Calif. sales add 3% tax)

CHAMPION PRODUCTS CO.
4513 E. Gage Avenue, Bell, Calif.

well-traveled route over which the enemy's troops and supplies are moving. A plane will sweep the road and disappear only for a second, to repeat the sweep for 15-20 minutes. This continued harassing of the enemy forces him to remain under cover throughout the day or, in the event he attempts to re-form the progress, the next Stormavik slashes the lines to ribbons.

With such a deadly fighter the Russians are winning their way through one of the most stirring epics of modern military history.

VICTORY

Flash News

(Continued from page 2)

tacks on enemy U-boats and a total of 12,000 anti-submarine patrols as well as 14,000 attacks on enemy shipping. One group of Spitfires of the Fighter Command has destroyed more than 500 enemy airplanes and a total of between 3,000 and 4,000 enemy planes are believed lost during the year. Special mention was made of the North American Mustang fighter (MODEL AIRPLANE NEWS, September 1941 issue) in that it has "revolutionized" Army Co-operation Command tactical use of supporting aircraft so much that "one man does the job of two" and maximum speeds of more than 400 mph. were heretofore unheard of in this type, low-altitude fighter.

United States heavy bombers of the Eighth Army Air Force operating in North Africa, have destroyed more than 200 German fighters in 26 raids over Nazi occupied Europe during 1942, states a recent report. Total losses were 33 Fortresses, Liberators and Boston bombers. Fighter pilots of the command made approximately 1350 patrols over Europe and conducted nearly 900 offensive operations. Only nine pilots are missing from these operations.

Curtiss-Wright recently announced that it is rushing to completion one of the largest and most completely equipped aeronautical research laboratories in the entire world. Location of the huge plant will not be divulged until after the war.

Jacqueline Cochrane announces that the latest feminine pilot training program is designed to produce ferry pilots for single engine airplanes to be flown between points lying within the continental limits of the United States. The number of airplanes ferried across the South Atlantic and Africa to Egypt has been stepped up many times since the landings of American troops in North Africa. More than 3,000 fighting planes were supplied to the Russians by the U.S. and Britain in 1942. Ninety-seven percent of the many thousands of airplanes which have been ferried across the North Atlantic to England reached their destination safely.

The Hon. Robert Perkins, Conservative, of the British House of Commons, recently made reference to a huge new British flying-boat known as the York. It is similar in design to the famed Sunderland flying-boat but larger and of increased firepower and performance.

According to Charles E. Wilson, new Czar of American aircraft production, the aviation industry will be required to carry a load of "two or three times" its 1942 figures. The 1943 production estimates have been prepared by the joint Chiefs of Staff but figures are confidential to date. He did disclose, however, that the trend in 1943 will be towards increased production of heavy bombardment planes designed at an all-out attack on Germany and Japan preparatory to a follow-up land assault. General Arnold states that the present Flying Fortress and Liberator types are "the last of the small bombers." This year will find bombers of double the span and weight of these types with vastly increased ranges, bombloads and hitting power. Each of the new types will be self-sufficient in the air requiring no fighter escort, thereby releasing these types for more important duties.

Glenn L. Martin, head of the huge factory which bears his name, forsees no huge lay-off of aircraft personnel following the peace. According to the pioneer, who once built and flew an airplane without ever having seen one, the first 18 months after cessation of hostlities will be devoted to new designing and developing into production, after which the industry will begin the relatively swift climb back to wartime peak and in "five or six years" all our wartime workers will be needed. Primary will be the demands of a commercial aviation business bigger than anything we have ever dreamed. World airlines will be commonplace and long-distance air freight carried in huge flying freight-cars will be far cheaper than land transported goods.

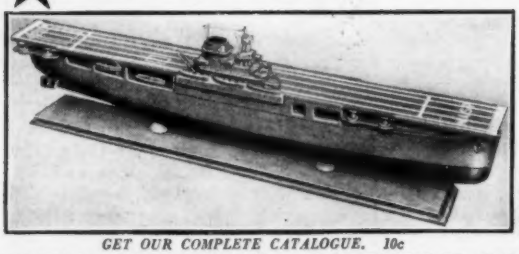
Large numbers of Vega Ventura bombers are now in use with the Royal Air Force, according to a recent British Air Ministry release, and the type is now in mass production in the United States. Planes of this type participated in the "devastating zero-level raid on the Phillips Radio Works at Eindhoven, Holland." The report describes the Ventura as "a twin engine plane based on the Lockheed Lodestar design with a quick takeoff and ability to climb at a very sharp angle. It is faster than the Lockheed Hudson bomber and is the British Coastal Command's latest aircraft.

Sir A. H. R. Fedden, renowned British aircraft engine designer and for many years Chief Engineer of the Bristol engine firm, has relinquished his post. His loss is a grave one to the British engine industry, for the Bristol type engine now supplies nearly one-half the total horsepower of late-type British combat planes. Fedden was directly responsible for development and perfection of the "sleeve-valve" type radial engine manufactured by the Bristol firm and on four separate occasions this type engine has broken the world's altitude record in addition to breaking the world's distance record which still stands.

Frank E. Samuels, 84, often called the "grandad of West Coast aviation" died recently at his home in Los Angeles. He was West Coast aviation manager for "Aero Digest" since its inception in 1922 and for two decades he has counted such renowned men as Donald Douglas, Robert Gross, Jack Fry and Reuben Fleet as his personal friends. In the early days he used to fly in "Jenny's" to deliver copies of the magazine to scattered airports on the Coast. The aviation publishing business regrets his loss.

VICTORY

★ Build a Perfect Replica of This Brave Ship! ★



MOULDED HULL INCLUDED, 18" LONG!

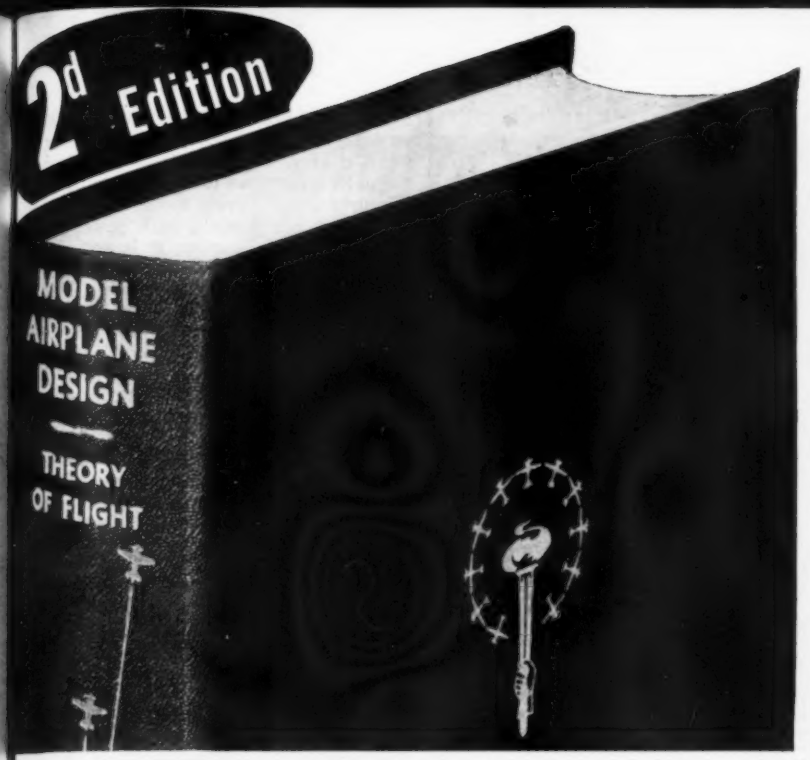
AIRCRAFT CARRIER WASP

COMPLETE CONSTRUCTION KIT

Includes everything needed to build an exact replica; our simplified parts and plans make it easy for anyone! 1.50 Postage 15c

GET OUR COMPLETE CATALOGUE. 10c

IDEAL AEROPLANE & SUPPLY CO., Inc., 20-24 West 19th St. NEW YORK



Basic Trainer for an Aviation Career

TREMENDOUS changes now taking place all over the world are unmistakably projecting us into a new era—the AIR AGE—which is certain to alter the lives of this generation and every future generation!

PREPARE FOR THE NEW AIR AGE!

Young Americans *with vision* are aware of the coming AIR AGE . . . and they are preparing for it with the aid of this important book.

"Model Airplane Design and Theory of Flight" presents a thorough training in the basic rules governing ALL flight, model and large plane—the required first step in an aviation career. Every reader will find the book fascinating and absorbing. And he will become thoroughly instructed in the aerodynamic principles for all flight.

This authoritative work has won worldwide recognition: schools, libraries and hundreds of men in the Army and Navy air forces and aviation industrial plants are using it as an indispensable handbook and reference volume.

Complete Instructor on Model Flying!

This Comprehensive Book Will Teach ANYONE How to Produce Consistently Fine Flying Models!

"MODEL AIRPLANE DESIGN AND THEORY OF FLIGHT"—a new book 30 years in the making, and the only one of its kind in existence—contains all the fundamental data upon which the success of present day model flying is based.

FOR BEGINNER OR ADVANCED STUDENT

In its pages the results of 30 years of experiment in designing and flying is graphically presented with the purpose of teaching anyone how to produce consistently fine flying models. It enables you to design your plane scientifically; it eliminates the "cut and try" method by introducing a plan of design based on simple basic rules which novice or expert can apply to achieve the goal of perfect flight.

SOLVES ALL YOUR FLIGHT PROBLEMS

Here you will find the answer to a thousand model questions—it tells you:

—How you can prevent spiral dives.
—How to make your plane fly straight.
—Why a plane stalls.
—What wing section to use.
—How large to make the stabilizer . . . the fin.
—What center of gravity is . . . and how to find it.
—At what angle to set the stabilizer.
—How big to make your plane . . . how much power it should have.
—What size propeller to use.
—How to calculate blade area.
—How much rubber to use in a motor for any given weight.
—What makes a gas engine run.

ETC. ETC.

528 PAGES 205 DIAGRAMS and PLANS • $3.75 Per Copy

Read what Major AL WILLIAMS says of this great book

"I know it will richly serve through the years in GUIDING and TRAINING the AIRMINDED YOUTH of our country."

—AL WILLIAMS

•

OTHERS WRITE:

"I am an instructor here in the twin-engine advanced flying school and have four very eager and apt cadets who are getting closer to their Army wings every day. It is my sincere belief that Mr. Grant's book will help instill a deeper 'know-how' about flying . . . I am an old model builder myself and find the book clears up many a knotty problem I've faced in designing my ships . . . Keep up your fine work!"—*From an Army Instructor.*

"It's a splendid piece of work the best ever written on model theory and construction . . . thoroughly sound and practical . . . and will be welcomed with joy by everyone interested in the art."—*Alexander Klemin, Daniel Guggenheim School of Aeronautics, N.Y. University.*

"Please send me as soon as possible a copy of C. H. Grant's book . . . Please send no other but this particular book for it is being used in our schoolwork."—*M.R.C.*

"I regard Mr. Grant as THE AUTHORITY."—*J.F.P.*

"Already in use as a text book in airplane design classes in high schools, this book should find its biggest reception in many of the pre-flight aeronautics classes being organized in schools throughout America."—*National Aeronautics*

"The author has established basic scientific principles for model airplane design, so that, instead of stumbling blindly through many attempts at correct proportions, the model builder need only apply the author's simple fundamental laws presented in this book for the first time. It is, in fact, a complete exposition of the aerodynamics and design of flying models, with formulas and graphs, and the author is commended for his thoroughness."—*Aero Digest.*

ORDER YOUR COPY NOW

MODEL AIRPLANE NEWS M33
551 Fifth Avenue, New York, N. Y.

Please send me postpaid a *new edition* copy of C. H. Grant's book "MODEL AIRPLANE DESIGN and THEORY OF FLIGHT," for which I enclose $3.75. (Outside U. S. $4.50.)

Name .....

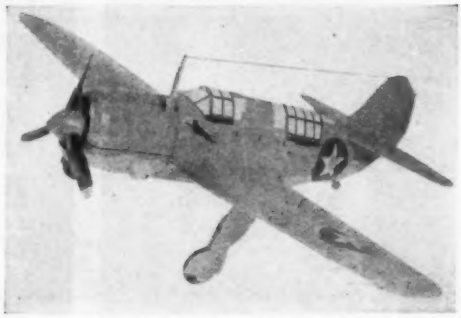
Address .....

C-Z *New Non-Critical Material*

SCALE MODELS

MORE FUN
THAN BALSA
BETTER
THAN TISSUE

DIFFERENT ★ NEW



Actual Photo of Curtiss Hell Diver Model

It's a brand new technique . . . intriguing for the experienced builder and easy for the beginner. Now you can build all the scale jobs you want without balsa or any essential materials. You don't even need paint because this basic material has the proper color painted right on it! Every part accurately numbered and outlined for easy assembly. All hollow constructed with ribbed wings and former type fuselage. Sturdy, tough and more durable than balsa models. Get in on this new fun . . . you'll enjoy it more than ever . . . and remember all C-Z models are famous for their authenticity. The following brand new numbers are ready right now.

2 Navy Planes	Gruman Avenger	85c
	Curtiss Hell Diver	75c
2 Army Planes	Curtiss P-40-F	50c
	Republic Thunderbolt	50c
2 British Planes	Hurricane	60c
	Spitfire	60c

If your dealer doesn't have these kits yet send direct to us and enclose 15c for postage and packing.

STILL AVAILABLE If you will hurry . . . and if you are lucky you can still get several of the popular C-Z metal covered scale model kits. We have a few on hand as the materials were purchased before they became critical. Get all the information on C-Z models.

SEND TODAY—5c for our complete catalog

C-Z Model Airplane Co. Dept. M, 5056 Archer Ave. CHICAGO : ILLINOIS

Fighters Unmasked

(Continued from page 7)

area): $\frac{A}{W}$. High wing loading, then is a detriment to an airplane and, contrary to popular opinion, the penalty the designer must pay in building high-strength but therefore weighty fighter planes.

The Power Loading of an airplane is the weight of the airplane divided by the horsepower of the engine which tells us what weight each horsepower must carry. Since the greater this weight/h.p. the more work the engine has to do, designers strive to keep this figure at its lowest possible point. Performance, then, may also be said to be inversely proportional to power loading, or $\frac{P}{W}$. Combining these two factors we see that flight efficiency is a function of a low wing loading and a low power loading, or: $F = \frac{AP}{W}$

With this formula the better known fighter planes of the warring nations may be given an Index Number and these may be used as a basis for setting up a comparative listing. It must be borne in mind that we are now considering only the general, all-around aerodynamic efficiency of the airplane, not its combat qualities. Here, then, are the world's best-known fighter planes and their standing in relationship to each other:

Number	*Name*	*Nation*	*Index Number*
1.	Lockheed P-38	United States	52.40
2.	Republic P-47	United States	47.00
3.	Focke-Wulf FW-190	Germany	45.10
4.	Spitfire	Great Britain	42.75
5.	Hurricane	Great Britain	40.20
6.	North American P-51	United States	35.00
7.	Mitsubishi 00	Japan	34.10
8.	Curtiss P-40	United States	33.90
9.	Heinkel HE-113	Germany	33.80
10.	Bell P-39	United States	33.10
11.	Messerschmitt ME-109	Germany	32.90
12.	Fiat G-50	Italy	31.60
13.	Macchi C-202	Italy	30.60

Certainly the showing of the Lockheed P-38 (Model Airplane News, May, 1939 issue) and the Republic "Thunderbolt" P-47 (Model Airplane News, December, 1942 issue) will come as no surprise for these powerful ships are easily the fastest in the entire world. Unfortunately, it is not possible, due to restrictions by the Navy Department, to give a rating for the Vought-Sikorsky F4U-1 (Model Airplane News, October, 1940 issue) but most assuredly it rates neck-and-neck with the P-38 and P-47. The "Thunderbolt" recently dived vertically at a speed of 725 miles per hour which is very, very close to the speed of sound, long presumed the absolute terminal velocity for any moving mass.

Since, in our formula, high power increases the index number, it is not surprising that the Focke-Wulf FW-190 (Model Airplane News, November, 1942 issue), Germany's light-weight fighter, places third. The extremely low weight of the Japanese Mitsubishi "Zero" fighter (Model Airplane News, January, 1943 issue) placed it much higher on the scale than popular opinion might, but in fighter design the deduction of weight is a very primary consideration when higher horsepowers cannot cover the deficiency.

The surprisingly poor showing of the Bell "Airacobra" P-39 can be attributed directly to its low horsepower having only a single Allison engine of 1050 horsepower in the version considered.

But just how important is this "efficiency" in warfare? Military airplanes are the most inefficient aircraft designs produced, this quality being sacrificed almost completely for speed and tactical strength. However, this efficiency plays a vital role in the craft's fuel and oil consumption and therefore in the cost of operating these planes. From the above chart, the United States is operating her fighters at a much lower cost per flying hour than those of other nations. The German fighters are enormously expensive airplanes to operate and the Italian fighters are in action at an obviously near-prohibitive expense.

However, as we pointed out above, this "efficiency rating" is only a part of the story and the genuine basis of comparison must also include the factor of "Fire Power", all important in aerial warfare. Fire power can be said to mean the total weight of shell thrown by an airplane at a specified projectile velocity during a specified time. Standard aircraft armament now is use by the Allied Nations are the .30 and .50-caliber machine-guns and the 20 and 37 millimeter shell-guns or cannon. Those used by the Axis nations are the 7.7 and 12.7 millimeter machine-guns (equivalent in size and power to our .30 and .50-caliber weapons respectively) and the 20 millimeter cannon of which ours is a development.

Hitting power of a gun may be determined from the formula: K.E.=1/2 MV2 in which the Kinetic Energy equals one-half of the mass or weight multiplied by the square of the muzzle velocity. By an analysis of the weight of a given shell, the rate-of-fire of the gun, its muzzle velocity and the total number of such guns mounted on the airplane, the actual fire power may be determined.

For example, the standard .30-caliber aircraft machine-gun fires 16.67 rounds per second, each weighing .056 pounds, at an initial velocity of 2,700 ft.-lbs./second. Substituting these figures in the Kinetic Energy formula above, a figure of 3,400,000 ft.-lbs. of sheer hitting power will result. For practical purposes we will round this off to 3.4 times the number of such guns of that type mounted on the airplane. Should the "efficiency factor" of the airplane be 30 and should it be equipped with 4 .30-caliber guns, we multiply the 30

WHERE TO BUY IT

Hobby Dealers: Use this Classified Directory to reach *active* hobbyists in your vicinity. Write now for special low rates. Forms for April issue close February 9.

LOS ANGELES, CALIFORNIA

PICO MODEL AIRPLANE CO.
2580 W. Pico Blvd., Los Angeles, Cal.
We carry all nationally advertised Planes, Motors, HO Trains, Boats,
Phone Drexel 5894
Prompt mail order service.
Open 9 A.M. to 9 P.M.

PASADENA, CALIFORNIA

ACE MODEL SHOP
Hobby Headquarters
Complete Line of Model Supplies.
TRAINS • PLANES • BOATS • RACE CARS
Open evenings 'til 9. Phone Sy 3-6061
808 E. Colorado St., Pasadena, Calif.

NO. SACRAMENTO, CALIFORNIA

"HOBBYCRAFTS"
Leading makes model ships, airplanes, railroads, engines, race cars, books, power tools.
Mail orders filled. Try us for those hard-to-get items.
Open Evenings
1030 Del Paso Blvd., No. Sacramento
No. Sac. 9-9805

HARTFORD, CONNECTICUT

A MESSAGE to Our NEW CUSTOMERS
For TEN YEARS, we have specialized, on the best obtainable MODEL-KITS—MOTORS & ACCESSORIES, on the market. This special hobby line will meet your approval, on price and quality. And with our suggestions and helpful instructions, it's a service and privilege you don't find everywhere. We will appreciate your patronage for 1943—and look forward to making your acquaintance in the near future.
Open 10-AM to 6-PM; Sat. till 9-PM; Phone 6-2475
MODEL BUILDERS GUILD
—Established 1933—
EIGHTY-ONE LAWRENCE ST., HARTFORD, CONN.

WASHINGTON, D. C.

Since 1890
CORR'S
Complete Stock Airplanes - Boats - Trains - Race Cars -
Full line of motor parts
Mail orders filled immediately
812 9th St. N.W., Dept. A, Wash., D.C.

CHICAGO, ILLINOIS

PAT SWEENEY'S HOBBY SHOP
VISIT THE MOST COMPLETE HOBBY SHOP IN CHICAGO
Race Cars—Boats—Engines
Surface Line, Bus and Elevated to the door.
4508 Broadway Chicago
OPEN TUES., THURS., SAT. EVE., 9 P.M.
Phone Long Beach 7251

CHICAGO, ILLINOIS

WEST TOWNS HOBBY SHOP
5729-31 W. Lake St.
Opposite Menard St. "L" Station
Leading lines of model airplanes, boats and railroads in stock.
Phone Estebrook 3272.
No parking troubles.
Open 9 a.m. to 9 p.m. daily

QUINCY, MASSACHUSETTS

NEW ENGLAND'S
FINEST MODEL SUPPLY HOUSE
Airplanes—Boats—Trains—Race Cars
Miniature Gasoline Motors
STANLEY—WINTHROP'S

Boston	Quincy
38 Chauncy St.	7 Revere Rd.
Hubbard 5668	Granite 0253

DETROIT, MICHIGAN

THE MODEL SHOP
1474 Gratiot Ave., Detroit, Mich.
We stock Comet, Ideal, Marine Model, Capitol, Megow, Berkeley and all major lines.
The Model Shop for Model Builders!
Ph. Ra. 9113

ST. LOUIS, MISSOURI

HOBBY-CRAFT
Compton At Shenandoah, St. Louis, Mo.
Read the Ads in Model Airplane News Then
Write—Wire—Call Your Order.
We Got It.
3 Hour Mail Order Service.
Send In Your Old Motor For Estimate

NEW BRUNSWICK, NEW JERSEY

STEVE VARGA'S HOBBY SHOP
We Carry All Leading Lines of Model Airplanes—Ship Models and Model Railroad Supplies in H. O. Gauge
Mail Orders Promptly Filled
55 Easton Ave., New Brunswick, N. J.
Telephone N. B. 7616

NEWARK, NEW JERSEY

Jersey modellers . . . KRESGE is FOR YOU! With characteristic thoroughness of a KRESGE Specialized Department—our 6th floor HOBBY CENTER is recognized as the central supply source for any project. Mail and phone orders promptly filled.
Telephone MItchell 2-8000, Extension 1
KRESGE DEPARTMENT STORE
Newark, New Jersey

NEW YORK CITY, NEW YORK

In New York it's POLK'S. Kits, Engines, Railroad Equipment, Boats, Race Cars and Supplies for All Hobbies. Come in and see us.
Phone Longacre 5-2434
POLK'S MODEL CRAFT HOBBIES
429 7th Ave. New York City

NEW YORK CITY, NEW YORK

GAS & RUBBER MODEL ACCESSORIES
Beginners or advanced modelers equally welcomed. Advice cheerfully given.
Gas Motors—Gas Jobs
Mail orders promptly filled. Minimum $1.00
YORKVILLE MODEL AEROPLANE SUPPLY CO.
208 East 88th Street, N. Y. C.

ROCHESTER, NEW YORK

CRAFT SERVICE
"Complete Hobby Stocks"
C-D, Comet, Peerless, Berkeley, Capitol, Stromberk, Ideal, Megow, American Junior . . . all major lines, complete.
Motors a specialty! Both used and new in stock!
Courteous fast replies—24 hour shipments. Write to our "Hobbyland Shop."
Also supplies for Leathercraft, Archery, Beadcraft, Plastics, etc.
337 University Avenue Rochester, New York

PORTLAND, OREGON

PORTLAND HOBBIES
AND HOME FURNISHINGS CO.
Railroads O-HO-OO, Boats, Race Cars, and Airplanes—Solid and Kit Models, Air King, American Junior Fireball, Cleveland, Hawk, Berkeley, Modelcraft, Scientific Propellers, Quality Balsa, Elf Engines, Bunch Motors Ohlsson 60, 23 and 19.
5100 S.E. Foster Road Open until 9 P.M.
Portland, Ore.

PHILADELPHIA, PENNSYLVANIA

VISIT OUR COMPLETE HOBBY DEPARTMENT ON THE 5th FLOOR
Full line of gas and rubber model accessories. Also Trains, Boats and Racing Cars.
STRAWBRIDGE & CLOTHIER
DEPT. STORE
Market Street, Philadelphia, Penn.

SEATTLE, WASHINGTON

HOBBY CRAFT—H. T. WEEKS
THE BON MARCHE DEPT. STORE
SEATTLE, WASH.
We carry all the leading lines of Model Airplanes, Ship Models, Model Railroads O-OO-HO, and Autos.
Large stock of parts and supplies
Mail orders filled same day received

MILWAUKEE, WISCONSIN

STEVE PATTI COMPANY
Nationally Advertised
Lines of Models and Supplies
ARCHERY EQUIPMENT
Prompt Mail Order Service
$1.00 minimum
1443 W. Forest Home Avenue
Milwaukee, Wisconsin

TORONTO, ONT., CANADA

Visit Canada's Most Complete Hobby Stores.
Railroads. O-HO-OO-Tinplate.
AIRPLANES—BOATS—RACING CARS—MOTORS.
COMET — IDEAL — BERKELEY — CLEVELAND — EASYBUILT
and other popular makes.
Open Evenings. Wholesale and Retail.
Complete Catalog 10 cents.
LLOYDS HOBBYCRAFT
635 St. Clair Ave. W.

WINNIPEG, CANADA

ST. JOHN MODEL SHOP
The West's Leading Hobby House
Complete stock of all the popular makes including COMET—BERKELEY—MEGOW—SCIENTIFIC and EASYBUILT kits.
Dept. A
644 Portage Ave. Winnipeg, Man.

Best By Test Model Co.

ANNOUNCES . . . .

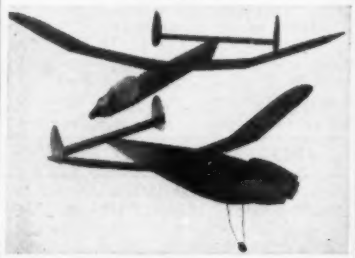
A new kind of **"PINE"** accurately cut and almost as light as balsa—and by a special process is further **"DE-HYDRATED"** after cutting which gives you a new medium in building those flying models. Special sizes and lengths also obtainable. This and dozens of other hard to get items in our new 1943 PRICE LIST—5c. DEALERS WRITE.

30 Ft. 3/16" BROWN CONTEST RUBBER WITH EACH KIT

(WHILE IT LASTS)

All parts cut out 36" Wing Span

STRATOMETER



ALTIMETER

Each kit with 30 ft. 3/36" brown rubber—$1.50

Without rubber $1.25

Add 15c packing and postage charge on each kit.

WHAT YOU GET

Finished wing and stabilizer ribs, trailing edges, finished drilled and tapered nose plug. Colored AAA Ussue, B.B.T. cement, steel wire, stamped dowel plates, 14" machine cut prop. Plenty of balsa strips and giant plan included. Stratometer has finished sheet sides of choice stock. Altimeter has finished landing gear with wheel attached. Finished steel motor hook.

BEST BY TEST MODEL CO.

RIDGEFIELD PARK, NEW JERSEY

times 13.6 and arrive at a combat Index Number of 408. By this method a final evaluation of the world's fighter planes shows them lined up something like this:

Number	*Name*	*Nation*	*Index Number*
1.	Spitfire	Great Britain	4490.0
2.	Hurricane	Great Britain	4120.0
3.	North American P-51	United States	3580.0
4.	Republic P-47	United States	2300.0
5.	Lockheed P-38	United States	1875.0
6.	Bell P-39	United States	1586.0
7.	Curtiss P-40	United States	1285.0
8.	Heinkel HE-113	Germany	1100.0
9.	Messerschmitt ME-109	Germany	1067.0
10.	Mitsubishi 00	Japan	1020.0
11.	Focke-Wulf FW-190	Germany	910.0
12.	Fiat G-50	Italy	600.0
13.	Macchi C-202	Italy	582.0

Certainly this has changed the picture considerably with Britain's heavily-armed "Terror Twins" holding the spotlight by a considerable margin. Both of these ships have appeared in two versions, the Spitfire being armed with either twelve .50-caliber machine-guns or four 20-millimeter cannon and the Hurricane being equipped with either twelve .50-caliber machine-guns or two 20-millimeter cannon. Best American fighting plane, then, is the North American "Mustang" (MODEL AIRPLANE NEWS, September, 1941 issue) armed with four 20-millimeter cannon, the world's most powerful and hardest-hitting aircraft armament now in service. The Lockheed P-38, the most "efficient" battleplane in the world, has now dropped down the list to fifth place due to its comparatively weak armament.

It may come as a surprise to some to learn that the 37-millimeter cannon is actually not as effective as the smaller 20-millimeter weapon but the differences between the muzzle velocity and most particularly the rate-of-fire create a decided advantage to the 20-millimeter cannon. Whereas the 37-millimeter has a muzzle velocity of only 2000 fps and a rate-of-fire of 2.5 shells/second, even though the projectile weighs 2.24 pounds, it does not compare with the fast 10 shells/second blast of the 20-millimeter firing a shell weighing .63 pounds at a muzzle velocity of 2850 fps.

Changes in armament are so rapid as to re-organize any comparative listing such as the above at frequent intervals. And these changes make vast differences in the rating of the airplane. For example, should the 37-millimeter cannon in the hollow nose of the Airacobra be replaced with a 20-millimeter weapon, its rating would change from 1586 to 2420 placing it next only to the Mustang in hitting power.

The famed "Zero" fighter is now in 10th place on our list due to its low muzzle-velocity low hitting power cannon.

These Index Numbers have been based only on the known armament and weight-horsepower-wing area figures released by the War Department which, for obvious reasons, do not contain the very latest information. Therefore, it is quite probable that our "Thunderbolt" and Lockheed P-38 fighter planes are superior to England's Spitfire and therefore the most deadly combat planes in existence. However, the important facts are that the warplanes of the United States, according to an accurate mathematical analysis taking into consideration the physical engineering qualities of each plane, are outstanding in comparison with those of other nations and those are the things we wanted to learn.

These conclusions are daily reiterated by the fine showing of our planes in North Africa, the Solomon Islands and the Russian campaigns and even those who would insist on combat comparisons rather than mathematical formulae as outlined above, can agree that Uncle Sam is producing the best that there is. We have spoken above only of actual production types now in service for more than a year. Changes, redesigns and the addition of power and armament all increase our Index Numbers and it is probably that for the time being, at least, only the Navy and War Departments, having access to these figures, will know the real, inside story of how our planes compare with those of the enemy.

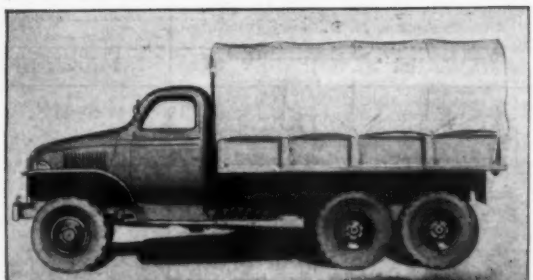
But we may be sure that our planes are superior to those of the enemy in every respect along fighting lines and with the well-trained and nervy fighter that the American combat pilot is, at the controls,

Austin-Craft

ACCESSORY GUIDE

LIFELIKE SCALE MODEL!!

U. S. Army 2½ TON Cargo Truck



THE BIG FELLOW

Complete Detailed Kit with Parts Pre-Cut, Ready for Assembly.

Austin - Craft's new number for "Model Motorized Divisions" — a faithful *authentic* model of the U. S. Army's tough "ten wheeler"! Plans drawn to *accurate scale measurements* with plain, easy to follow instructions. Entire assembly work can be done in one sitting.

Like the JEEP, this new Austin-Craft Army kit is precision-built from highest quality materials (balsa or pine) for easy handling and close-fitting construction. Contains complete parts including five overhead pre-shaped ribs, regulation O.D. tarpaulin, headlights, bumpers, radiator grill material, ten wheels and spare, etc., etc. A scale miniature of U. S. Army motorized vehicle, not a toy. *Start your motorized division* with the Austin-Craft official U. S. Army truck and the Austin-Craft official (Willys-Overland) Jeep.

Immediate shipment..... **$1.50**

On mail orders add 10c postage

AUSTIN-CRAFT CO. 431 SOUTH VICTORY BOULEVARD, BURBANK, CALIFORNIA

Gentlemen: ☐ Send Austin Craft Army Truck ($1.60) ☐ Austin Craft Jeep (70c). (B)

Name .....

Address .....

City ..... State .....

we may rest assured that they will search out and hit the enemy hard on every front until a complete and lasting victory has been won.

VICTORY IN '43

Modeling Your Future in Aviation

(Continued from page 19)

ferred the total frame stick length may be taken as 7/8 of the wingspan, or 14". This allows the same nose length as the first method, and gives correct proportions for gliders or rubber powered planes with landing gear located close to the forward tip of the stick or body.

In gliders the stick length is a comparatively flexible value and may even be made equal to the wingspan, then less weight will have to be added at its forward end for proper flight balance. The plans show a 14" stick with wire wound around it near the nose to give balance.

Now only two other characteristics must be determined; camber and wing dihedral. Camber is the height of the upper surface wing curve from the chord line running from leading to trailing edges. It should be 1/12 the wing chord on wings covered top and bottom (double surface wings), as this one will be. (When wings are the same thickness from leading to trailing edge, as a sheet of curved balsa would be, they are "single surface wings." Camber then should be 1/16 the chord for gliders). The wing chord is 2-1/4" so *Camber* $C_a = 1/12 \times 2\text{-}1/4 = 3/16"$.

To insure sufficient lateral stability and quick recovery the wings are given a dihedral of 1/12 the wing span, so *dihedral* $= 1/12 \times (16) = 1\text{-}3/8"$. This means that each wing tip is to be raised 1-3/8" above a horizontal line passing through the wing chord at the wing center. This chord line lies in the wing's lower surface at its center. So when the center rests on a bench or table, each tip should be raised 1-3/8" from the table and the wing halves cemented together at the center in this position.

Two other important aerodynamic factors pertaining to assembling the various units are: the wing angle of incidence and the stabilizer angle. The former is the angle of the wing chord to the centerline of the stick or fuselage, and in gliders should be from 1 to 1-1/2 degrees; 1-1/3 degrees is satisfactory. This angle is assured by raising the wing leading edge 3/64" higher from the stick centerline than the trailing edge.

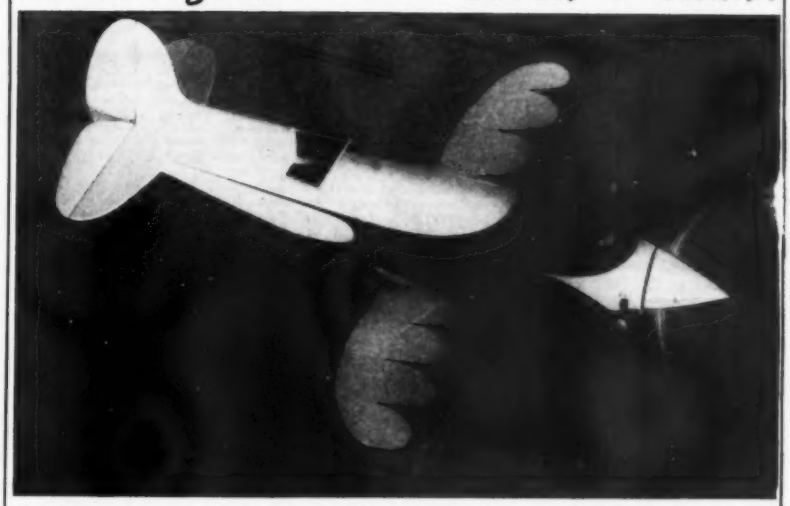
The stabilizer is set at 0 degrees on gliders, so it must be parallel to the stick centerline, thus giving a *difference in angle between wing and stabilizer of 1-1/3 degrees*, a most important factor for longitudinal stability.

Now the aerodynamic design of the glider has been established. A resume of the correct proportions and measurements follows:

Wing span, S=16"
" chord, C=1/7 S=2-1/4"
" Area, A=34 sq. in.
Stabilizer span, $S_s = (0.4) \times S = 6.4"$
" chord, $C_s = (0.85) \times C = 1.9"$ or (1-7/8")
" area, $A_s = 10.16$ sq. in. $= (0.3) \times A$

SUPER "G" LINE FLYING
ENTIRELY NEW & DIFFERENT

Announcing The SUPER "G" SHARK



IT'S HERE, A Sensational New Directional Control System, SUPER "G" LINE FLYING and a Sensational New Elevator Type Control Model, The SUPER "G" SHARK, illustrated above. Especially designed for Super Speed and Stunt Flying, this Mighty Shark roars through space at speeds of over 100 M.P.H. Yet, so simple in construction and operation that even the beginner will experience no trouble. May be powered with any class "C" motor, such as the Ohlsson "60's," the Tiger Aero, the Super Cyclone, etc.

The New Super "G" Shark Construction Kit is a Prize-Winner. Contains plenty of fine quality, carefully sawn Wood, Hardwood, Plywood, Printed Parts, Cement, Dope, Covering Paper, Spring Wire, Streamlined Wheels, Super "G" Line Control Parts, etc. Together with a large fully detailed plan and instructions for building and flying.

COMPLETE $3.95 KIT
POSTAGE 30c

REGULAR "G" LINE & FREE-FLIGHT MODELS

BABY SHARK SUPER SPEEDSTER

COMPLETE $1.98 KIT
Postage 20c

The new BABY SHARK, Super Streamlined Speed Ship, is designed for all Class A and B motors. This snappy little job flies at tremendous speeds of from 50 to 75 M.P.H.

TIGER SHARK SPEED DEMON

DELUXE $4.95 KIT
Postage 30c

The TIGER SHARK, Super Speed Demon, is designed for all ½ H.P. motors. It roars through the air at unbelievable speed of from 60 to 90 M.P.H.

INTERCEPTORS UP

Fly the Sensational New INTERCEPTOR. Super Performance Class B Free-flight model. Tremendous climbing qualities. Kit unusually complete. $2.98 Postage 30c

SHARK P-60 "G" LINE MODELS

New Rubber Power and Gas Power Kits

Build and Fly one of these thrilling new ARMY TYPE PURSUIT "G" Line Speed Ships. All Kits are unusually complete throughout.

Complete Shark P-60 Kits

Rubber Power Kit Complete $1.95 POSTAGE 20c

For All Class C ½ H. P. Motors $2.98 POSTAGE 30c

DESCRIPTIVE FOLDERS, 5c

VICTOR STANZEL & CO., Dept. M., SCHULENBURG, TEXAS

CONTENTS

of C. H. Grant's widely acclaimed book "MODEL AIRPLANE DESIGN AND THEORY OF FLIGHT." 528 pages, 205 diagrams and plans, numerous graphs and formulas. ($3.75 in U.S. and possessions; $4.50 elsewhere)

Part I—Wings

CHAPTER 1. FLIGHT REQUIREMENTS
Factors of Flight: Lift, Propulsion, Power, Stability, Landing, Framework, Control.

CHAPTER 2. WINGS
How Lift is Generated—Curved (Cambered) Wing Surfaces—Wing Efficiency—Double-surface Wings—Lift Variation; Camber and Chord—Amount of Camber—Angle of Attack—Center of Pressure—How Speed is Calculated—Graphic Method of Determining Speed—Wing Characteristics and Their Effect on Performance—Type of Wing Sections—How to Select the Proper Wing Section—Aspect Ratio—Raking the Ends—Tapered Wings—Biplanes—Triplanes—Why Efficiency is Lost—Stagger—Summary of Part I.

Part II—Stability

CHAPTER 3. HOW TO OBTAIN STABILITY
Three Kinds of Stability—Tapered Wing with Sweepback—Dihedral Angle—Curved Dihedral—Semi-Dihedral Wing—Combination of Lateral Stabilizing Influences—Low Center of Gravity with Sweepback—Dihedral with Low C. G.—Directional Stability—How to Measure Fin Area—Fin Moment Arm—Effect of Weight Distribution—Spiral and Longitudinal Stability—I. Displacement or Disturbing Factors—Pusher Models—Wing Chord Size—Difference in Angle between Wing and Stabilizer—Speed—Stabilizer Moment Arm—Position of Thrust Line Relative to Center of Pressure—II. Corrective Factors—Stabilizer Chord Angle, Wing Angle—Stabilizer Area—C. G. back of C. L.

CHAPTER 4. PRINCIPLES OF STABILITY
How to Find Center of Gravity—Action of Low C. G., Sweepback Wings and Dihedral Angle—Low C. G. with Sweepback or Dihedral—Directional, Spiral and Longitudinal Stability—Degree of Stability—How Wing Position and Speed Affect Longitudinal Stability—Effect of Speed—Down Thrust—Effect of Wing Chord Size—Effect of Weight Distribution—Factors that Aid Stability—Effect of Thrust Line Position—Propeller Effect—Summary of Part II.

Part III—Propellers

CHAPTER 5. THE RUBBER DRIVEN PROPELLER
Straight Pitch—Helical Pitch—Diameter, Pitch, Blade Angle and Blade Area Defined—How to Determine Pitch—Determining Pitch of a Completed Propeller—Determining the Most Efficient Blade Form—Blade Area Determined—Propeller Design—Correct Diameter Values—Blade Angle—Pitch—Blade Crossection—Blade Area.

CHAPTER 6. THE THEORY OF BLADE AREA EFFECT
Determining an Exact Blade Area Formula—Block Size.

CHAPTER 7. HOW TO DETERMINE DIMENSIONS OF A PROPELLER BLOCK.
Pitch Tables—Blade Area Tables—Blade Area and Block Size Tables—Graphic Method of Determining Block Size.

CHAPTER 8. GAS ENGINE PROPELLERS
Factors that Influence Design—Blade Width-Diameter Ratio—How to Determine Diameter and Pitch—How to Use the Table—Power Required for a Finished Propeller—Measuring Pitch—Determining Flying Speed and Corresponding Pitch—Determining Propeller Characteristics for Various Wing Cambers and Angles of Incidence—Plane Speed at Various Angles of Incidence—Blade Width and Diameter by Formula—Pitch, Diameter and Blade Width for Various Engine and Propeller Speeds—Making the Propeller to Design Specifications—Cutting Propellers—Determining Propeller Block Dimensions—Summary of Part III.

Part IV—Power

CHAPTER 9. RUBBER POWER
Rubber Band Motors—Torque—Work—Power—Torque Tables and Graphs-Winding—Power Factors—Rubber Quality—Effect of Lubricant on Turns—Stretching—Fatigue—Effect of Lubricant on Torque—Work Potential—Effect of Lubricant on Work Potential—Black and Brown Rubber Compared—Power Factors Developed When Motors Unwind—Effect of Strand Size—Lubricated, Unstretched Motors—How Work Varies with Number of Strands.

CHAPTER 10. RUBBER POWER FORMULAS
Torque, Turns, Work and Repeated Windings of Black and Brown—Torque Relationship—Effect of Stretching and Winding—Variation of Work.

CHAPTER 11. APPLICATION OF POWER
Comparative Performance of Rubber Motors—Series Geared Motors—Twin Motors and Propellers—Application of Power—Motor Duration.

CHAPTER 12. PRINCIPLES OF GAS ENGINE OPERATION
Two Cycle and Four Cycle Operation—Mixing Valve—Carburetor—Ignition System. Summary of Part IV.

Part V—Design Procedure

CHAPTER 13. DESIGNING A STABILITY STICK MODEL
Arrangement of Aerodynamic Factors—Arrangement of Weights—Choice of Structural Type—How to Select the Suitable Model Type—Proportions—Span—Chord—Camber—Propeller Design—Diameter—Pitch—Blade Area—Block Size—Stability Factor—Lateral and Directional—Fin: Moment Arm—Area—Proportioning; Stabilizer: Moment Arm—Area—Landing Gear—Frame and Motor—Shape of Parts—Wing—Tail Surfaces—Frame Parts. Summary.

CHAPTER 14. DESIGNING A STABILITY FUSELAGE MODEL

CHAPTER 15. DESIGNING THE SPEED MODEL

CHAPTER 16. DESIGNING THE DISTANCE MODEL

CHAPTER 17. DESIGNING A DURATION MODEL

CHAPTER 18. DESIGNING THE GAS MODEL
Performance Requirements—Purpose—Type Most Suitable—Force Arrangement—Scale Gas Models—Force Arrangements of Exact Scale Models, and How to Select Types for Greatest Stability—Proportions—Size—Power Plant—Power-Size Ratio—How to Determine Exact Wing Area and Weight of a Gas Model—Correct Plane Size When Wing Loading is 10 Oz. per Sq. Ft.—Span and Chord—Wing Section—Force Arrangement—Size of Tail Surfaces—Calculating Fin Area—Designing the Fin—Angular Setting of Fin—Calculating Stabilizer Area—Shape of Tail Surfaces—Crossection of Tail Surfaces—Propeller—Determining Blade Width by Graph and by Formula—Calculating Propeller Block Dimensions. Summary of Two Stable, High Performance Gas Models.

Part VI—Control

CHAPTER 19. CONTROL OF FLIGHT BY DESIGN

CHAPTER 20. CHECKING FOR ADJUSTMENT AND BALANCE

CHAPTER 21. FLIGHT TESTING

INDEX

(Additional data on this book, including photo, will be found on page 55 of this issue.)

"Model Airplane Design and Theory of Flight"—6 x 9 inches, beautifully bound in cloth and gold stamped—costs only $3.75 postpaid. The price is unusually low for a full size, technical reference work and is made possible through *Model Airplane News* facilities. Get your copy by ordering today from:

MODEL AIRPLANE NEWS
551 Fifth Ave., New York, N. Y.

Tail moment arm, $M = (0.5) \times S = 8''$
Fin height, $F_H = (0.43)S_S = 2\text{-}3/4''$
" chord, $C_F = S_S = 1.9''$ or (1-7/8)
" area, $A_F = 4.2$ sq. in. $= (0.12) \times A$
Nose length, $N = (0.62) \times M = 4.8''$
Body length, $= (7/8)S = 14''$
Camber, $C_a = (1/12)C = 3/16''$
Wing tip rise $= (1/12)S = 1\text{-}3/8''$

Fig. 78 shows the materialization of these proportions in the form of the glider to be built. The next step in creating our model is to determine its structure; this is governed chiefly by material available. The glider may be made of balsa wood or, if this cannot be obtained, hardwood and paper. All parts can be solid if balsa is used; however, the glider made of solid hardwood would be quite heavy.

In this case an assembled frame structure must be worked out. The wing can be composed of leading and trailing edge and spars with ribs between them at intervals along the span; of course these are shaped to give the desired external form: the whole frame can be covered with paper. Stabilizer and fin should be light. To reduce their weight when hardwood is used, cut out the centers as indicated in the plans, then cover both top and bottom with tissue paper.

The other main part of the glider is the body or frame stick; this can be solid whether made of balsa or hardwood. However a hollow stick can be made by cementing together two 1/4" wood channels, their flanges being each 1/8". This will produce a 1/4" square hollow hardwood stick.

Balsa wood weighs from 5 to 16 lb. per cubic foot, average light balsa is 7 or 8 lb. The best hardwoods to use, evaluated in the order mentioned, are: first, basswood, redwood or cigarbox wood (there is very little choice between these); 2nd, whitewood or poplar; 3rd, white pine; 4th, spruce. The evaluation of these woods may be contrary to average opinion but it is based on laboratory tests. Whitepine should not be used for stressed parts in gliders because it is extremely brittle and though light, it is weak; used as a frame stick it will snap upon the slightest impact. For bulky parts carrying no stresses, like fillets or parts that give form, white pine may be used. In all cases basswood is preferred as it is of uniform grain, comparatively tough for its weight and usually available. Basswood weighs about 30 lb. per cubic foot, about 4 times as much as balsa. Spruce is slightly heavier, 32 lb. per cu. ft., but it is the strongest known wood for its weight and is excellent for stressed parts. It is more difficult to cut than basswood, however, so it is not used commonly; it has a long stringy grain which resists stresses but makes shaping difficult.

When building a glider bear in mind that hardwood weighs approximately 4 times as much as balsa, so in order that both hardwood and balsa gliders weigh the same, design the hardwood glider so that only 1/4 of the material is used as in the case of the balsa glider; for instance, in the wing cut away 3/4 of the bulk of the wing. On the plans you will note that the front and rear spar and ribs approximately equal 1/4 of the total volume of the wing itself, so this wing, when

Super Detailed BREWSTER-BERMUDA
A DELUXE GIANT SIZE Solid

'Cut-To-Outline' FUSELAGES-TAPERED

For faithful, life-like solids of the best-known Fighters and Bombers—work with a precision CONSOLIDATED . . . the kit you formerly called BURKARD! They're BIG (spans up to 22½") sturdy models that really look "true-to-type"—because they've been adapted (in most cases) right from the manufacturers' plans of the original plane! Includes lots of exclusive "detail-touches!" Kits are complete with turned wheels, aluminum cowls (here specified) liquids, cockpit celluloid, drop material, insignia and tail striping. Consult kit list below for your next project. Most models are

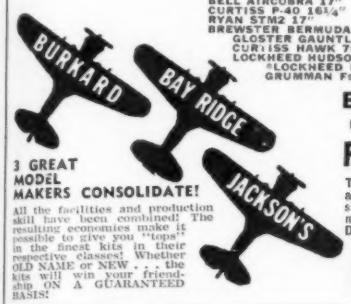
WINGS, TAIL & TRAILING EDGES $1.50
By mail: Add 20c per kit for parking, postage.

CARVED, PLANED AND TRIMMED FUSELAGE to make
'LIFETIME' MODELS
Sanding only needed. Select HARDWOOD fuselage, finished including cockpit. Regular kit price PLUS $1.00.

CONVENIENT CHECK LIST

BELL AIRCOBRA 17"
CURTISS P-40 16¼"
RYAN STM2 17"
BREWSTER BERMUDA 17½"
GLOSTER GAUNTLET 17½"
CURTISS HAWK 75 16"
LOCKHEED HUDSON 16½"
*LOCKHEED P38 20"
GRUMMAN F4-F2 15"
HAWKER HURRICANE 17½"
NORTH AMER. BT-14 20"
BOULTON PAUL DEFIANT 20"
SPITFIRE 18"
MESSERSCHMITT ME109 16"
*STUKA DIVE BOMBER 22½"
*WESTLAND WHIRLWIND 22½"
(Kits marked * list at $2.00 each)

NOTE: The ONLY difference between standard and deluxe kits is IN THE FUSELAGE! DELUXE KIT includes the CARVED FUSELAGE instead of "cut-to-outline" body! Aside from this there is no difference in contents!



3 GREAT MODEL MAKERS CONSOLIDATE!
All the facilities and production skill have been combined! The resulting economies make it possible to give you "tops" in the finest kits in their respective classes! Whether OLD NAME or NEW . . . the kits will win your friendship ON A GUARANTEED BASIS!

BAYRIDGE FLIERS
Now produced in our modern plant

PACER Current, National Class "C" Champ $4.95
Topped 1000 competitors at last nationals! 60" span, 45" long; Pacer 'B,' 53" span, $3.95; MIKE (1st small ship in gas model history), 48", $1.49; DIAMOND DEMON (A or B flight), 44", $1.49.

STRATO-SPEAR
Sensational 42" A or B
Gas job! Reg. 1½ min. flights on 10 sec. motor runs. Planked fuselage, formed landing gear, cut firewal, removable pylon, silkspan, liquids..... $2.95

BANTAM Replacement Parts
We are exclusive distributors of genuine factory replacements for these popular motors. Most units in stock. Write, stating requirement and low list prices.

ACCESSORY CAMOUFLAGE $1.00
Combination Kit
For metalizing AND camouflaging your model! The ORIGINAL combination kit contains Foil paper, brush, colors, cement, sandpaper, rivet detail tool and instructions.

ILLUSTRATED 36P Catalog 5c
Includes helpful model-making hints (illustrated) 5c coin or stamp. (SENT FREE WITH KIT ORDER!)

CONSOLIDATED MODEL ENGINEERING COMPANY
(Dept. M-3) 3079 Third Avenue, New York, N. Y.

made of hardwood, should be approximately the same weight as the balsa wing. This is also true of the stabilizer and rudder.

After working out the structural details in a number of sketches draw an accurate set of plans in pencil, similar to the ones shown on page 20. Wing, stabilizer, fin, ribs and irregular parts should be made full size so that they may be used as patterns. A general assembly view drawn either to full or half-scale will show how the plane will appear when finished. Do not start building until you have made a complete set of plans; in this way many mistakes will be avoided and time saved. When you have laid out these plans you will have a complete understanding of the structure and how it is to be put together; the "build as you proceed" method without plans always proves unsatisfactory in the end and it never results in a properly designed or constructed plane.

CONSTRUCTION: Now you are ready to construct the plane. First build the wing. If balsa is used shape it to the contour shown in the end view from sheet 2-1/4" wide x 3/16" thick. If balsa is not obtainable use hardwood.

First shape the ribs of which there will be 2 center, 8 intermediate, and 2 tip ribs. Only the upper surfaces of the tip ribs are shaped to begin with, the bottom will be shaped later when assembled. When this is done assemble each half-wing by cementing the ribs between the front and rear spar members; do not shape the spars until after they are assembled. Front spar measures 1/8" x 1/4", the rear spar 1/8" x 3/8."

The plan view of the wing including dotted lines will indicate how the ribs are to be cemented to these two pieces. Ribs should be cemented in tightly, the cement filling the angles between ribs and spare. Two small "V" shaped fillet pieces 1/8" thick are cemented in the angles between the center ribs and the spars, as shown on the plans.

When all joints have dried thoroughly the front and rear spars should be cut away to the cross-hatched crossection shown in the plan view of the wing; the dotted portion is the part cut away. This will provide a carefully streamlined wing section. The bottom of the tip ribs must be cut away on a bevel as indicated in Fig. 79. The lower outer curved edge is cut away so that the underside is flat from the lower inner straight edge to the upper curved edge. The front and rear spars are also bevelled to conform with the under surface of the tip rib.

When both wing halves are finished bevel the center so they fit together tightly when the tips are raised 1-3/8" above the level of the center point, as indicated in Fig. 79. The wing tips may be held at the proper elevation by blocks, books or some other steady means. Cement the two halves tightly together and allow the joint to dry with the tips raised.

Next cut out a stabilizer and fin from 1/32" sheet balsa or hardwood. If hardwood is used cut out the centers, as indicated by the dotted line, for lightening.

When completed the other parts may be made, namely, the frame stick, 14" long x 1/4" x 1/4"; the wing mount, shown on the plans, and the two fillet pieces. The upper side of the wing mount is notched to conform with the dihedral angle. The front view of the fillets is indicated in the assembly drawing; note the two sides are not at right angles to one another but are slightly more, about 95 degrees, due to the dihedral.

When the wing frame is thoroughly dry, cement the wing mount to its center as indicated in the front view. Then make and cement the triangular fillet pieces in place; these provide a strong joint at the wing center and avoid breakage in crashes. Parts may be held together with pins while the cement is drying.

When shaping the wing mount note it is deeper at the front end than at the rear; this gives the wing the proper angle of incidence. Be sure to make this carefully so that it conforms to the plans. At the front it should be approximately 1/4" and at the rear, 3/64" less.

Then the whole unit is cemented to the top of the frame stick as indicated in the front and side views. The center of the wing should be exactly 5" from the nose of the stick. This joint may be reinforced by binding the two bevelled ends of the wing mount to the stick with several strands of thread; see the side view.

Cement the stabilizer to the underside of the frame stick at the rear and the rudder to its right side, as shown in Fig. 78.

Now all that remains to be done is add

We Still Have It!

BALSA: Strips and sheets

18" and 24" lengths—limited supply. Also complete stock of Megow, Comet, Cleveland, Aircraft, Scientific, Bayridge, Ideal kits.

Twenty-four hour service!

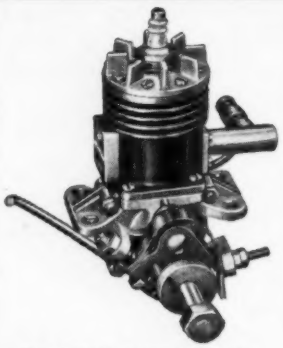
MOD-KRAFF COMPANY
4506-08 Freret St., New Orleans, La.

Rogers New Address!

743 Beaubian St., Detroit, Mich.

Effective January 11th, we will be in our new plant in Detroit, the "Motor City." Complete factory set-up with the best possible equipment for service, replacement parts and accessories will be in operation at once. To be sure of the *best*, have your Rogers Motors serviced by the manufacturer.

Rogers MOTOR CO.
Detroit, Mich.



ONLY $9.95 Complete

Here is your opportunity to buy the 1943 model of the famous G.H.Q. Gasoline Motor. ABSOLUTELY COMPLETE—Every engine assembled by experts, fully bench run and unconditionally guaranteed!

REALLY COMPLETE!!

Everything is included: Champion spark plug, COIL, CONDENSER, tank and cap, ignition wire, simple illustrated instructions, etc.

NOT A KIT! Factory assembled, fully bench tested and ready to run.

Specifications of New 1943 Model

4 Port 2 Stroke Cycle. ¾" Stroke. 15/16" Bore. 300-7,000 R.P.M. Bearing Surface, 1¼" Long. Crankshaft, 5/16" Diam. Rotation, Either Direction. May be run inverted. 1/5 Horsepower. Class C under NAA Rules.

FREE!!

Send 6c for circular or 25c for circular and Jumbo catalog of hundreds of hard-to-get model motor, plane, boat, car and hobby items.

AN ENGINEERING TRIUMPH
Never Before at So Low a Price

Imagine operating your own G.H.Q. 1/5 Horse Power gasoline engine—small enough to fit in the palm of your hand—yet turning up over 7,000 revolutions per minute and powerful enough to fly model airplanes of from 4 to 10 foot wingspan, and propel model boats from one to six feet in length and midget cars that travel over fifty miles an hour! There are also hundreds of other ways you can enjoy using this miniature yet powerful power plant—for small pumps, generators, compressors, blowers, fans, grinders and countless other experimental purposes.

This engine has been tested and proven over the last nine years. Over sixty-five thousand of these powerful little G.H.Q. engines are now in actual daily use. 15,000 sold in the last year. Why not join the ranks of these hobbyists?

WE HAVE ENGINES! Your Order Shipped Same Day As Received. No Delay!!

How To ORDER: Send only $1.00. We Ship Coll. C. O. D. Same Day

G.H.Q. Motors, Dept. MX, 40 E. 21st., N.Y.C.

weight to the nose to provide proper flight balance. Cement small pieces of wood, as indicated in the nose-weight detail drawing, to the upper and lower sides of the frame stick on the nose. Then wind several loops of soft annealed wire around the stick within the notches shown. The amount of wire to use may be determined by suspending the model on two fingers at the wing center near the frame stick; the fingers should support the model at a point squal distance from leading to trailing edge. Then cut a length of wire, bend it into a "U" and hook it on the stick at the nose.

The model will balance in a horizontal position if the wire is the proper weight. If the nose raises use more wire, if the nose is too heavy cut some away until the exact amount is determined. Then wrap this wire around the stick within the groove and bend in the end with pliers so it will not become loose or detached.

Your plane is now ready for flight except for the covering. Of course if balsa is used no covering is required. If made of hardwood cover the wing, stabilizer and fin, top and bottom, with tissue paper, cutting out the paper so there will be 1/8" margin all around the part.

Start by covering the lower sides first, half the wing or stabilizer at a time. Cement the paper to the center rib then stretch it spanwise toward the tip, cementing it in place to each rib successively, finally to the tip rib. Then cover the front and rear spars with cement and tack down the paper tightly to them, turning over the 1/8" margin all around the wing. The top is then covered in similar manner.

When cementing the paper to the stabilizer and fin be sure not to use too much cement, this increases the weight of the model; only a little is needed on these parts.

To tighten the covering spray it lightly with fine water-spray; a fine-spray atomizer may be used. Allow it to dry, keeping the model in an upright position with even support under the wings so they will not warp while the paper is drying.

FLYING: Now your model is ready for flight. Test it by gliding it gently with the nose pointed slightly upward. Do not throw it hard at first. If it glides steadily to the ground without nosing up or diving in, the model is correctly balanced; if it noses up or glides in a series of jumps, more weight is needed on the nose; if it dives in and doesn't float gently, less wire weight should be used. Adjust your model carefully until the glide is smooth. Then more extended flights can be made by throwing the glider with considerable force, wings tilted to one side and the nose pointed upward.

The method of launching and adjustment for various types of flights is described in article 3, September issue; we suggest you read this carefully. With a little practice long and even out-of-sight flights may be made with this little ship.

VICTORY

Sky Scouts

(Continued from page 35)

troops.

PLANE 5C—The Nakajima 90-11 two seat naval reconnaissance plane is powered by a 450 hp. Nakajima Jupiter engine and has an estimated top speed of about 190 m.p.h. Span is 39 ft. 4 in. and length 29 ft. 6 in. Fully loaded it weighs 5,500 lbs. Armament appears to be the same as on the Nakajima 94. This plane operates from war ships by catapault, mainly on scouting missions. Its presence signifies the approach of naval units.

PLANE 5D—The German Dornier Do 18K reconnaissance flyingboat is powered by two 600 hp. Junkers Jumo 205 liquid-cooled Diesel engines. It is capable of 160 m.p.h. with full military complement and has a range of over 3,000 miles. Fully loaded the plane weighs 22,000 lbs. It is designed for catapult takeoff as well as normal takeoff. Because of this, its range and formidable armament, it is an exceptionally dangerous menace to shipping and "hit and run" raiding. The craft is used extensively by the Nazi Naval Units and may be spotted along the U.S. Eastern seaboard before hostilities cease. Whether or not Japan has also been using this plane, we have not at the time of this writing been able to ascertain. Chief points of recognition are the tandem motors, high wing setting and the sponsons or stub wings.

PLANE 6A—The Focke-Wulf FW 200 "Condor," troop transport equipped with four B.M.W. 132 G air cooled engines each developing 720 hp. The craft is capable of carrying 30 fully equipped soldiers plus crew of four. Wingspan is 108 feet 3 inches; length, 78 ft. 3 in.; height, 20 ft. Empty, ship weighs 21,560 lbs.; weight loaded, 32,120 lbs. The Condor has a maximum speed of 233 m.p.h. at 13,000 ft. Range is 775 mi. at 217 m.p.h. and a rate of climb of some 1,300 feet per minute.

PLANE 6B—The Heinkel HE 116, troop and freight transport powered by four Herth HM 508 G engines each developing 270 hp. It has a useful load capacity of 6,094 lbs. Wingspan is 72 ft. 2 in.; length, 44 ft. 11 in.; height, 12 ft. 6 in. Weight empty is 9,592 lbs. Known to have a maximum speed of over 230 m.p.h., its range is 2,795 miles with service ceiling of 21,650 ft. The ship is of monocoque design fabricated of wood and covered with ply.

PLANE 6C—The Junkers JU 90, well known troop transport. Powered by four B.M.W. 132 H engines, each developing some 880 hp., it carries a crew of three and accommodated 40 fully equipped soldiers. The JU 90 is capable of 217 m.p.h. at 3,600 ft. altitude, with service range of 1,300 mi. Service ceiling is said to be 18,000 feet. Wingspan is 114 ft. 10 in.; length, 86 ft. 3 in. Weighs 35,000 lbs. empty; 50,600 lbs. loaded. It is of typical Junkers all-metal construction and cumbersome in appearance. It features sharply sweepback wings, twin rudders and "floating" elevator.

PLANE 7A—The Blohm und Voss Bv 142 four motor troop transport. This is one of the least known of Germany's four motor troop planes even though it is the offspring of the famous Blohm und Voss Ha 139 of trans-Atlantic fame. The Bv 142 is powered with four 830 hp. B.M.W. 132H motors and is capable of carrying 1,440 gallons of fuel. The fuselage is of monocoque design, oval shaped at the front and gradually becoming circular at the tail. Provisions for carrying at least 30 fully equipped soldiers in addition to a regular crew of pilot, co-pilot and radio operator were maintained by the designers. The craft has a wingspan of 96 ft. 9 in.; length, 64 ft. 7 in.; height, 15 ft. 6 in. Wing area is 1,399 sq. ft. Maximum speed is said to be 248 m.p.h. Range has been established at 2,730 miles and its service ceiling is 22,300 ft. Empty, the plane weighs 22,930 lbs.; loaded, 36,380 lbs.

PLANE 7B—The Heinkel He 115K2, torpedo plane. The He 115 was one of the first topedo planes tested by Heinkel engineers and adapted by the Germans. It is powered by two 880 hp. BMW 132Dc nine cylinder engines and develops a speed of over 200 m.p.h. Service ceiling for this craft is said to be 21,320 ft. Although the craft is poorly armed in regards to machine guns for protective purposes (it carries only two machine guns, one forward and one aft), offensive armament is quite potent. Beneath the fuselage it carries a torpedo weighing 1,764 lbs. Wingspan is 75 ft. 10 in.; length, 57 ft.; height, 23 ft. 4 in.; wing area, 946 sq. ft. Empty, the ship weighs 11,670 lbs.; loaded 20,020 lbs.

PLANE 7C—The Kawanishi 91, reconnaissance bomber flyingboat used by the Japanese Imperial Navy Air Arm. Powered by two 600 hp. engines, it is capable of non-stop flights over 2,300 miles. Its only protection for warding off attackers are two machine gun pits; one on the hull nose, the other aft of the wing. It has a span of 77 ft. 7 in. Top speed is comparatively slow; only 132 m.p.h.

FLYING MODELS How to Build and Fly Them

118 Pages – 500 Illustrations **25¢** *At Your Dealer* 35c Postpaid

CONTENTS:

HINTS FOR BUILDERS

Tools and Equipment—Model Materials—Selecting Strip Stock—Cutting the Parts—Pinning the Frames—Fitting Problems—Cementing the Frames—Trimming the Frames—Built-up Nose Sections—Cardboard Formers and Ribs—The Plan Sheet

BUILDING THE FRAMES

Fuselage Construction

Side Frame Method—Full Former Method—Crutch Method

Wing Frame Construction

Checking Rib Lengths—Dihedral Angle Block—Bending Root Rib—Wings Without Bottom Spar (Butt, Fishnose and Slotted Ribs)—Wings With Bottom Spar—Single Panel Wings—Wing Panels Built in Two Sections—Wings Without Center Panel—Wings With Center Panel

Stabilizer and Rudder Construction

COVERING THE FRAMES

General Procedure—Applying Stiff Paper—Applying Cellophane—Tissue Pattern Key—Applying Tissue to Round Fuselage—Applying Tissue to Fuselage with Flat Sides—Applying Tissue to Wings and Tail Surfaces

ASSEMBLING THE MODEL

General Procedure—Stabilizer and Rudder to Fuselage—Wings to Fuselage—Monoplanes—Biplanes—N Struts—Wing Fillets—Rear Motor Mounts—Landing Gears—Doping the Model—Assembling Propeller Units—Motor Hook-ups—Hints on Decorating—Adding Guns, Aerials, etc.

FLYING THE MODEL

Balancing the Model—Test Gliding the Model—Powered Test Flights

PAUL K. GUILLOW, Wakefield, Mass.

PLANE 8A—Dornier Do 24, three engine German patrol boat. Powered by air cooled engines it is one of the easiest Dornier boats to "spot." Its extremely high wing, thick sponsons and twin tail aid in its identification. The craft mounts three movable machine gun turrets with a possible total of six guns.

PLANE 8B—Heinkel He 177, Germany's latest heavy bomber, was test flown two years ago and kept on the secret list until recently when the "bugs" were completely ironed out. Then it began rolling out of German factories in great numbers. The unique feature of this craft is that it is a four engine airplane although its external lines indicate it as a twin motor job. Its four 1,150 hp. Mercedes Benz DB .601 engines are coupled into twin power units housed in but a single cowling and nacelle in each wing panel. Each unit drives a single four bladed propeller. Engines are set up side by side and in this form assume the designation DB .606. Units are liquid cooled but employ nose radiators which create the impression that they are air cooled. It mounts 2 cannons, one in the nose the other in the tail in addition to many defensively located machine guns. Dimensions are: span, 103 ft. 4 in.; length, 67 ft. 3 in.; height, 18 ft. 2 in.; wing area, 1,660 sq. ft. Weights: empty, 35,000 lbs.; loaded, 71,600 lbs.; max. overload, 82,000 lbs. Performance: max. speed, 280 m.p.h. at 19,000 ft.; max. range, 7,040 miles; service ceiling, 25,000 ft.

PLANE 8C—Dornier Do 26K, one of the latest long range flying boats produced by Dornier. It is powered with four 600 hp. Junkers Jumo 205C Diesel motors, has a top speed of 208 m.p.h. and is capable of carrying 1,000 lbs. of bombs, a 23 mm. cannon in the nose and two blister turrets in the fuselage. Dimensions: span 98 ft. 6 in.; length, 80 ft. 6 in.; height, 22 ft. 6 in.; wing area, 1,290 sq. ft.

PLANE 8D—Junkers Ju 86K bomber, powered by two 880 hp. BMW 132 Dc engines. It mounts machine guns in three stations; in the nose, beneath the fuselage and aft of the wing. Dimensions: span, 73 ft. 10 in.; length, 58 ft. 8 in.; height, 15 ft. 8 in.; wing area, 882 sq. ft.; weight empty, 11,354 lbs.; loaded, 19,040 lbs.; max. speed, 242 mhp.; range, 915 miles; service ceiling 25,280 ft.

VICTORY

Aviation Advisory Board

(Continued from page 30)

formance in different cases, depending upon the design of the airplane. These factors do not have a definite or constant effect in all types of planes in themselves; their effect is coupled with other design features; for instance, wing angle of incidence, stabilizer area, etc.

Airplanes may be made to perform properly and well with long or short moment arms depending upon the values of these other factors. If you wish further details and complete explanation it is suggested you read some good book on the design of model airplanes.

Question: What is the center of lift? How is it located?

Answer: The center of lift is the point at which the resultant of all the small lifting forces on the wing act. It is located at the middle of the wing when the wing is of uniform contour and angle on both sides of its center chord. Usually it is located from 1/3 of the chord length back from the leading edge to 1/2 the chord length. Its position along the chord dependes upon the angle at which the wing is flying (angle of attack). If the angle is large the center of pressure will be forward; if small, back.

Question: Should the wing be mounted low or high on the fuselage or on a wing pylon?

Answer: The rear wing should be mounted on the motor stick or slightly below. The small front wing should be raised well above the stick, its center raised a distance equal to 1/4 the span. When raised in this manner the dihedral should be only 18 to 20 degrees of each wing-half.

Question: Where should the center of gravity and the center of lateral area be located? Where would you put the rudders?

Answer: The position of the c.g. will depend upon the size and angle of the front wing relative to the rear. The rear wing should have zero angle of attack, the front wing 3 degrees. The c.g. usually is located about 1/3 of the moment arm forward of the rear wing center.

With the dihedral and wing setup given, the c.l.a. will be located approximately in the right position.

On fast gas models it may be necessary to add fin area below the thrust line; on

NEW BOAT READY!

BUILD OK-4 at home in a Few Evenings

WRITE for big illustrated **FREE** Circulars!

Mead's sensational new 14-foot **portable** Outboard KI-YAK OK-4 carries 4 adults and duffle—takes motors up to 9 H.P., oars and sail. Weighs only 75 lbs. Seaworthy, dependable. Biggest, lightest, strongest of its kind! You can build yours easily, quickly, perfectly at home in a few evenings from our **patented**, complete construction kit **and save nearly HALF!** Big money assembling, selling to others. 3 other paddle-sail KI-YAKS from 18 to 45 lbs. . . . also OK-2 for motor, sail, oars . . . weighs 50 lbs.) Double paddle or oars now **included** with your Kit. Write for Free, lavishly illustrated circulars, low-factory-to-you prices!

MEAD GLIDERS, 15 Sa. Market, Dept. K-33, CHICAGO

CLASSIFIED DIRECTORY

Advertise in this directory for quick profitable results! Rates 10c per word including name and address. Minimum 20 words. REMITTANCES MUST ACCOMPANY ALL ADS FOR THIS DIRECTORY. Advertisements for April issue must be in by February 10.

WE pay cash for new or used model airplane motors or race cars. Hobbycrafts, 1030 Del Paso, North Sacramento, Calif.

GAS Motors in stock. Ohlsson, Brown, Dennymite, Marvin, Cannon, Rogers, Dreadnaught. Kits and supplies. Art Kronfelt, 4 Leslie Road, Belmont Mass.

BACK dated magazines (foreign, domestic). Books—latest fiction. Used, new textbooks. Catalogs 10c (refunded). Cicerone's, 863 First Ave., New York.

FIGHTING aircraft of America—in action! Send 10c for 9" x 12" sample drawing of Grumman "Avenger" and list of many others. Henry Clark 147-28 90th Ave., Jamaica, N. Y.

FLIGHT Research Division large eastern aircraft manufacturer has opening for several draft deferred skillful young men as assistant instrument technicians. Employment Service, Model Airplane News, 551 Fifth Ave., New York.

COMET Distributors

Comet distributors, carrying complete stocks of Comet kits and supplies, are ready to serve dealers in every part of the country—promptly and efficiently.

Comet Western Model Airplane Co.
Pacific Coast Distributor
4546 Hollywood Blvd.
Los Angeles, California
1060 East 12th St.
Oakland, California

K. S. Caufield
Louisville Distributor
308-310 S. Third, Louisville, Ky.

H. F. AULER COMPANY
Milwaukee Distributor
1743 West Fond du Lac Ave.
Milwaukee, Wis.

Model Airplane Supply Co.
Houston & So. Texas Distributor
3105 S. Main St., Houston, Texas

HOBBY JOBBERS
New York Met. Area Distributor
Order Dept.—Office: 429-7th Ave., New York City

Modelcraft Distributors
Twin City Distributors
1336 S. Miss. Riv. Bl., St. Paul, Minn.

JOHN DUNN, INC.
Boston Met. Area and Maine Distributors
87 High St., Boston, Mass.

Germantown Model Supplies
Metropolitan Philadelphia Distr.
4523 N. Broad St., Philadelphia, Pa.

DAYTON HOBBY SERVICE
Ohio Distributor
313 S. Main St.
Dayton, Ohio

DOUGLAS MODELS CO.
Utah Distributor
105 E. Second South St.
Salt Lake City, Utah

Calvin C. Wood
Colorado Distributor
375 S. Williams, Denver, Colo.

LLOYDS HOBBYCRAFT
Canadian Distributor
625 St. Clair Ave., West
Toronto, Ontario, Canada

Howard E. Ruth Model & Supply Co.
Distributor Buffalo Area
1466 Genesee Street
Buffalo, N. Y.

AIRCO MODEL SUPPLY
Cent. and Eastern Michigan Distr.
1485 Antietam St.
Detroit, Mich.

Walthour & Hood Co.
Miss., Ala., Ga. Distributor
Pryor St. & Auburn Av., Atlanta, Ga.

KING MODEL AIRPLANE CO.
Kansas City, Mo. Distributor
4301 Independence Ave.
Kansas City, Mo.

J. Spokane & Co.
Pittsburgh Area Distributor
1106 Fifth Ave., Pittsburgh, Pa.

HAINES HOBBY
Distributors of the Reading Area
44 S. Sixth St., Reading, Pa.

SCRANTON HOBBY CENTER
Scranton Area Distributor
315 Adams Ave., Town Hall Bldg.
Scranton, Pa.

rubber models no fins or rudders are necessary. Data on this type of plane is given in "Model Airplane Design & Theory of Flight."

Question: What is wrong with a single pusher when it starts rocking back and forth in the glide and then spins into the right?

Answer: There is too little dihedral in the rear wing and it is possible that this plane will require a small fin below the center of the rear wing. This will correct your trouble. However the original cause is probably due to the front wing being set at too high angle of attack, thereby bringing the center of resistance too far forward of the c.g. Too much dihedral on the front wing often causes this condition. Rather than increase the dihedral of the rear wing it is preferable to use a fin below.

Question: Would a folded prop act as a rudder on a pusher? Would it be better to have a single or double bladed folder?

Answer: No. A folder will not act as a rudder on a pusher; in fact it will have directly the opposite effect and in such cases a small fin must be used to give proper fin area at the rear when the prop is folded. Rigid propellers usually act as fin area and steady the plane in the glide. Probably double bladed folding props would be preferable to single bladed ones.

E. W. Schmidt of 847 W. 53 Street, Chicago, Ill., asks:

Question: Do you favor an engine in an upright or inverted position?

Answer: There are advantages to both, depending upon the construction of your plane. Usually it is advantageous to place the thrust line high. Usually this necessitates the engine protruding from the top of the cowl if it is in an upright position. In such a case it is a distinct advantage to invert the engine so it will be enclosed within the cowl.

However engines usually run more efficiently when they are in the upright position because accumulation of oil in the cylinder often runs down on to the plug points and fouls them. Most engines run in the inverted position are not as reliable as when upright because of this condition.

Where plugs are in the side of the cylinder there is no disadvantage to the inverted engine. Some engines run equally well upright or inverted. This is a peculiarity of design.

Lind Golden of Ravenna, Nebraska has been troubled with a low-wing scale Howard rubber powered racer. He says that every time he flies it, it either zooms up or dives. At the end of the flight it zooms sharply upward. He has tried to increase the tail area but without improvement.

Question: What is the trouble?

Answer: Mr. Golden is on the right track when he increases the tail. However probably he failed to balance the model with the new area before flying it again. Usually increasing the tail area increases the tail weight and it is necessary then to move back the wing so the c.g. is approximately 50% of the chord from the leading edge. Unquestionably this would have given it correct flight.

Usually instability in a low-wing model is caused by incorrect angles of the wing and tail relative to the thrust line. The fact that the model zoomed at the end of the flight indicates that the thrust line was too negative relative to the wing and stabilizer. Best results are obtained in low-wing models when the wing is set at 0 to 1 degree angle of incidence and the stabilizer at 1 degree negative to the thrust line; in some cases 1 1/2 degrees. The c.g. usually should be about 40% to 50% back. In all cases the stabilizer should have an area equal to 1/3 the wing area except in gas models where it need be only 25%.

Until next month, Happy Landings!

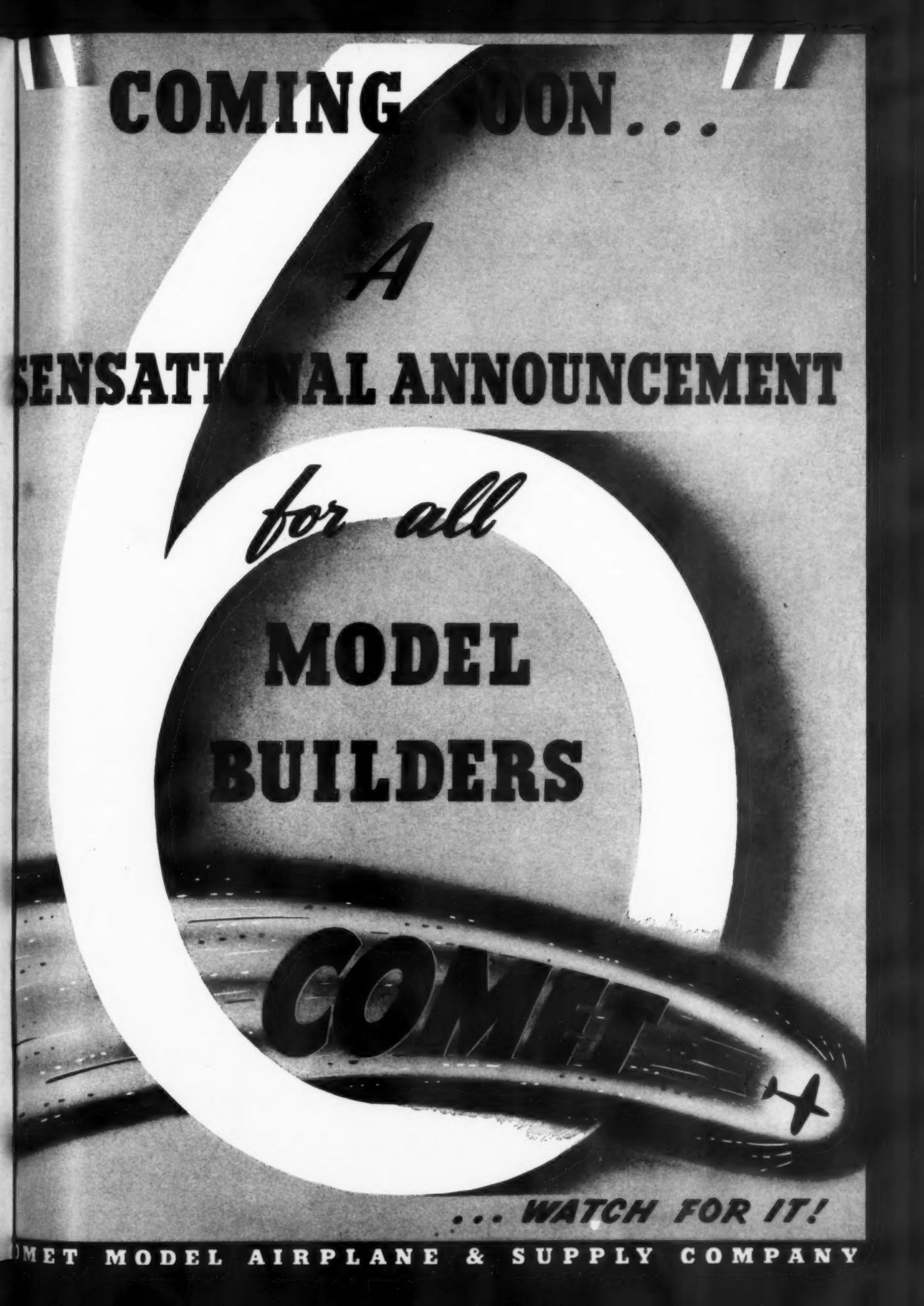
VICTORY

COMING SOON...

A SENSATIONAL ANNOUNCEMENT

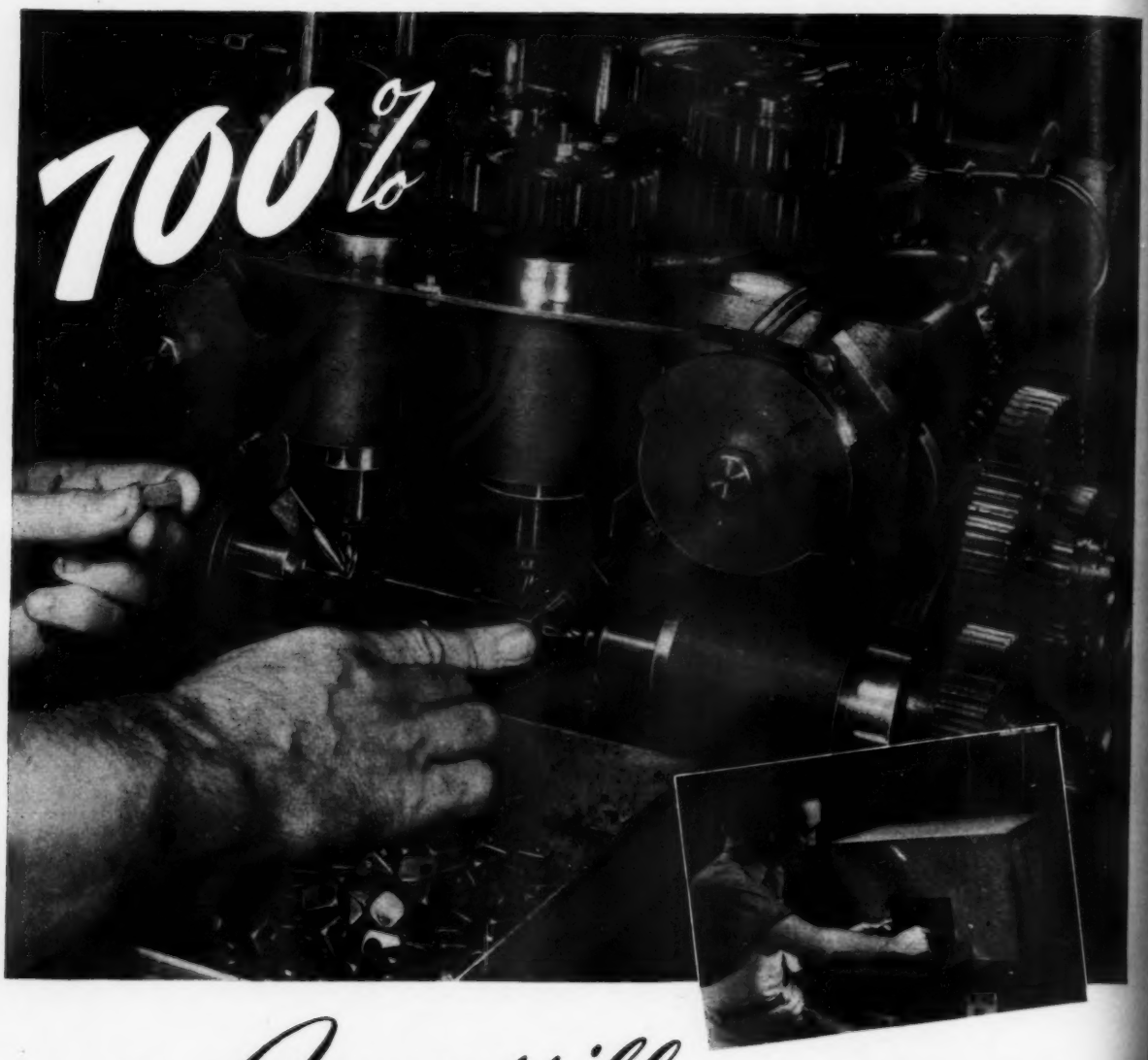
for all

MODEL BUILDERS



... WATCH FOR IT!

COMET MODEL AIRPLANE & SUPPLY COMPANY



AN *Impossible* FIGURE!

Strictly speaking, as any modeler knows, there's no such figure as 700%. But that didn't deter Ohlsson and Rice craftsmen from setting out to do what was the *impossible* on this particular war order, and achieving another production record.

The machine shown above is a piece of special equipment recently designed and built by Ohlsson and Rice craftsmen. It drills two holes in a steel driving block at a 90 degree angle, simultaneously. With the exception of loading the blocks, operation is automatic. The movement of the drills is governed by lifting cams which provide positive feed and, incidentally, greatly lengthen the life of the drills.

The introduction of this machine not only increased output of the part seven times over previous production, but also released seven skilled workmen for other important duties.

It's no news to model builders that practically every part of an Ohlsson miniature motor called for its own machine or machine tool. The experience and knowledge developed in pioneering miniature engine mass-production is now enabling Ohlsson and Rice craftsmen to put better war equipment in less-than-specified-time in the hands of our fighting men.

Everything Ohlsson and Rice possesses in skill, resources, and energy is devoted to the war effort. And if you're wondering about our morale under this pressure, *it's 700%.*

Large illustrated folder on Ohlsson and Rice Miniature Motors and "precision control" production methods mailed on request.

OHLSSON AND RICE
MANUFACTURING COMPANY
P. O. Box 2324, Terminal Annex, Los Angeles, Calif.

RIGHT OR *But at all!*